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GLOBAL DATA MONITORING REPORT

April 1999

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At RSMC Bracknell, for synoptic stations at or below a height of 500 metres, reported mean sea-level pressure is used in the statistics. If this is unavailable the mean sea-level pressure is calculated from the reported station-level pressure and temperature.

For synoptic stations above 500 metres, the mean sea-level pressure is calculated from the reported station-level pressure and temperature, or, if these are not available the height of a standard pressure-level (e.g.: 850 hPa or 700 hPa). If neither of these are available, the reported mean sea-level pressure is used.

Some stations vary their reporting practice according to the observation hour (e.g.: some stations in the CIS report both mean sea-level and station-level pressure at 00 & 12 UTC, but only mean sea-level pressure at 06 & 18 UTC). For monitoring purposes, reported mean sea-level pressure is stored separately from that calculated from station-level pressure or height of a standard pressure-level. Only statistics for the preferred method (see above) are presented in this report, and so for certain high-level stations, such as those from the CIS, approximately half of the number of observations actually received will appear in the statistics.

Aircraft observations

TABLE 4 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of aircraft reports (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) in the layer 70-500 hPa. Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700

Figure	Parameter Plotted	Layer (hPa)
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.
N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics **(Geopotential Height and Windspeed at 100 and 500 hPa)** for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 m s^{-1} (vector wind)

SELECTION CRITERIA :NOBS $\geq$ 20 , and one or more of the following:

1.| bias|	$\geq$ 4 hPa	(pressure),
	$\geq$ 5 m s^{-1}	(wind speed),
	$\geq$ 30 degrees	(direction).
2.SD	$\geq$ 6 hPa	(pressure),
	$\geq$ 80 degrees	(direction).
3.PGE	$\geq$ 25	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
BOAB	ALL	P	SUR	32	0	0	1.9	-4.0	4.4
ELUB5	ALL	P	SUR	30	3	10	2.6	5.0	5.6
LAXP4	ALL	P	SUR	44	0	0	1.8	-4.9	5.2
P3YS5	ALL	P	SUR	75	0	0	1.0	4.2	4.3
TEST1	ALL	P	SUR	40	23	57	2.7	-5.3	5.9
UBLX	ALL	P	SUR	22	7	32	1.4	0.1	1.4
UCTR	ALL	P	SUR	29	8	28	3.2	-3.2	4.5
UCTS	ALL	P	SUR	30	3	10	3.0	-10.6	11.0
UCUD	ALL	P	SUR	29	10	34	8.4	-1.5	8.5
UCUF	ALL	P	SUR	27	1	4	3.8	4.7	6.1
UCUP	ALL	P	SUR	44	3	7	4.2	-4.1	5.9
UFJJ	ALL	P	SUR	67	0	0	2.5	-4.0	4.7
UFJU	ALL	P	SUR	23	23	100			
UHVL	ALL	P	SUR	34	0	0	3.2	-4.1	5.2
VVGG	ALL	P	SUR	24	0	0	1.8	4.9	5.2
V7BI3	ALL	P	SUR	20	0	0	8.6	-5.1	10.0
WDZB	ALL	P	SUR	61	0	0	1.0	-6.3	6.4
WDZG	ALL	P	SUR	20	1	5	1.1	-5.1	5.2
WQZ9670	ALL	P	SUR	126	0	0	2.3	-4.9	5.4
ZCAM9	ALL	P	SUR	68	0	0	2.5	8.0	8.4
ZSDN	ALL	P	SUR	50	0	0	1.1	4.9	5.0
3ECI8	ALL	P	SUR	51	0	0	1.3	-5.3	5.4
3FGQ3	ALL	P	SUR	45	0	0	0.8	9.6	9.7
48102	ALL	P	SUR	349	150	43	1.2	-0.1	1.2
WIND SPEED									
C6IF	ALL	SPEED	SUR	65	0	0	3.8	7.8	8.7
C6KF8	ALL	SPEED	SUR	96	0	0	4.6	8.5	9.6
C6LQ3	ALL	SPEED	SUR	62	0	0	6.0	7.4	9.5
C6MS4	ALL	SPEED	SUR	33	0	0	4.0	5.7	6.9
DGUC	ALL	SPEED	SUR	30	0	0	8.1	9.7	12.6
GVSN	ALL	SPEED	SUR	23	0	0	6.8	9.8	12.0
GYAB	ALL	SPEED	SUR	22	0	0	3.4	5.7	6.7
KGTZ	ALL	SPEED	SUR	20	0	0	4.6	5.7	7.4
LAVX4	ALL	SPEED	SUR	22	0	0	2.7	5.4	6.1
MWBJ9	ALL	SPEED	SUR	47	0	0	5.8	6.1	8.4
PCCY	ALL	SPEED	SUR	22	0	0	5.9	6.4	8.7
PFEU	ALL	SPEED	SUR	76	0	0	6.2	6.0	8.6
PFNG	ALL	SPEED	SUR	32	0	0	7.3	5.7	9.3
PFPZ	ALL	SPEED	SUR	20	0	0	4.6	5.5	7.2
PGDC	ALL	SPEED	SUR	49	0	0	6.5	7.3	9.8
PHSG	ALL	SPEED	SUR	24	0	0	5.3	5.2	7.5
PJOX	ALL	SPEED	SUR	23	0	0	8.3	5.7	10.1
SDIA	ALL	SPEED	SUR	36	0	0	3.6	5.0	6.1
SXZO	ALL	SPEED	SUR	24	0	0	3.3	5.4	6.3
SYMK	ALL	SPEED	SUR	41	0	0	2.1	5.6	6.0
S6BR	ALL	SPEED	SUR	36	0	0	3.4	5.5	6.5
VRUZ7	ALL	SPEED	SUR	21	0	0	3.4	8.2	8.8
V2TE	ALL	SPEED	SUR	21	0	0	6.8	7.8	10.3
3FTW	ALL	SPEED	SUR	50	0	0	4.0	6.4	7.6
WIND DIRECTION									
C6KF8	ALL	DIRN.	SUR	52	0	0	53.4	53.0	75.2
ELHR9	ALL	DIRN.	SUR	22	0	0	35.5	31.1	47.2
PFDI	ALL	DIRN.	SUR	25	0	0	104.7	44.3	113.7
42020	ALL	DIRN.	SUR	425	0	0	14.7	-30.3	33.7
51301	ALL	DIRN.	SUR	41	0	0	27.6	-55.4	61.8
9VBK	ALL	DIRN.	SUR	65	0	0	93.4	10.0	93.9
9VWH	ALL	DIRN.	SUR	22	0	0	119.2	4.8	119.3

AVAILABILITY – SHIP/SYNOP – APRIL 1999

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 21339

FIGURE 1

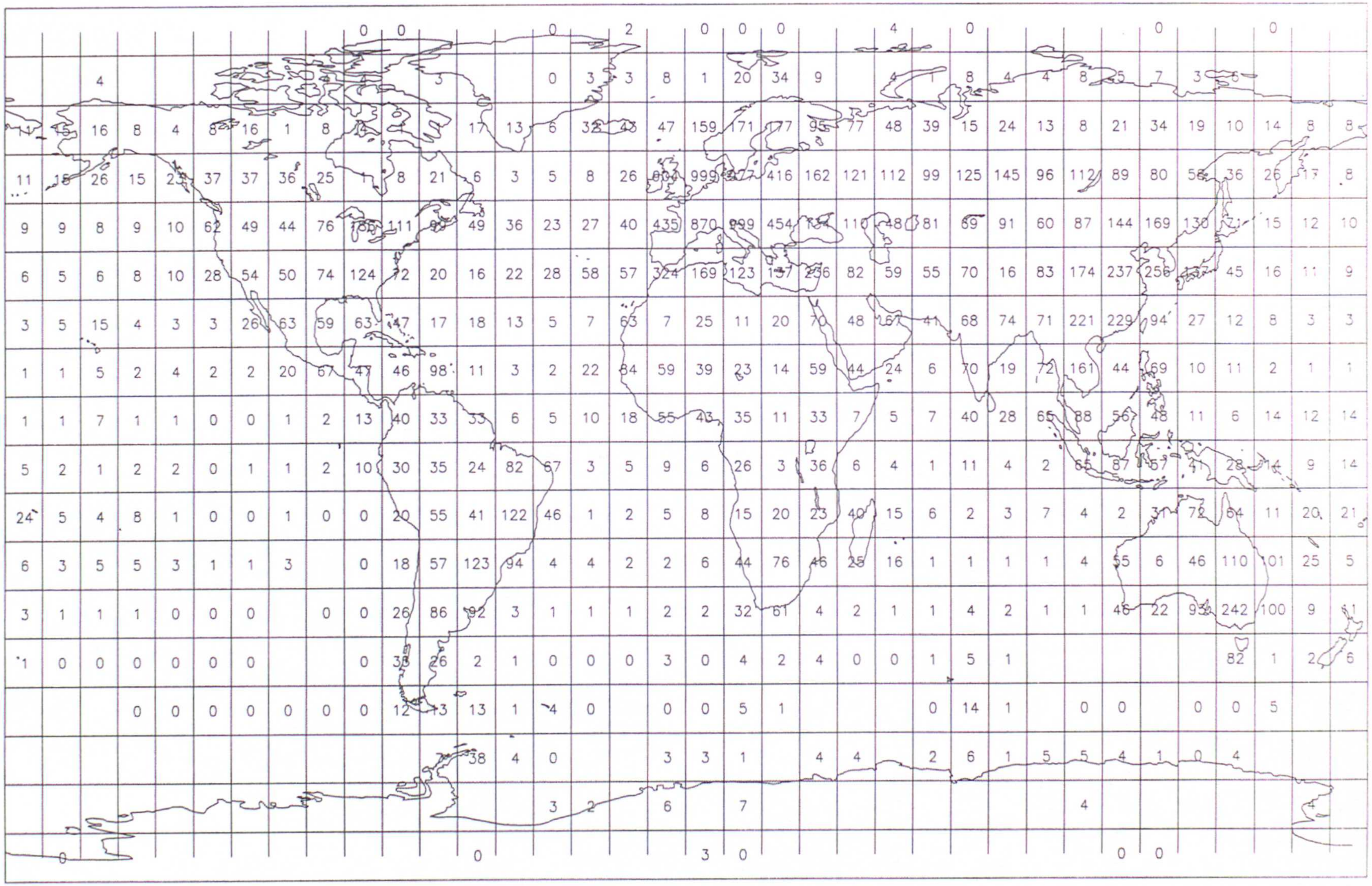


TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoys.

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 m s^{-1} (vector wind)

SELECTION CRITERIA : NOBS ≥ 20 , and one or more of the following:

1.| bias|	≥ 4 hPa	(pressure),
	≥ 5 m s^{-1}	(wind speed),
	≥ 30 degrees	(direction).
2.SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

```
IDENTIFIER  LAT.   LONG.   HOUR   ELEM   LEVEL NOBS   NGE   PGE     SD    BIAS    RMS

MEAN SEA LEVEL PRESSURE

25565        41.7  -87.1   ALL     P      SUR    95    46    48    3.9   -9.1    9.9

WIND DIRECTION

55587       -41.8  168.0   ALL    DIRN.   SUR   576     0     0   16.3   43.2   46.2
```

AVAILABILITY – DRIFTER – APRIL 1999

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 6030

FIGURE 2

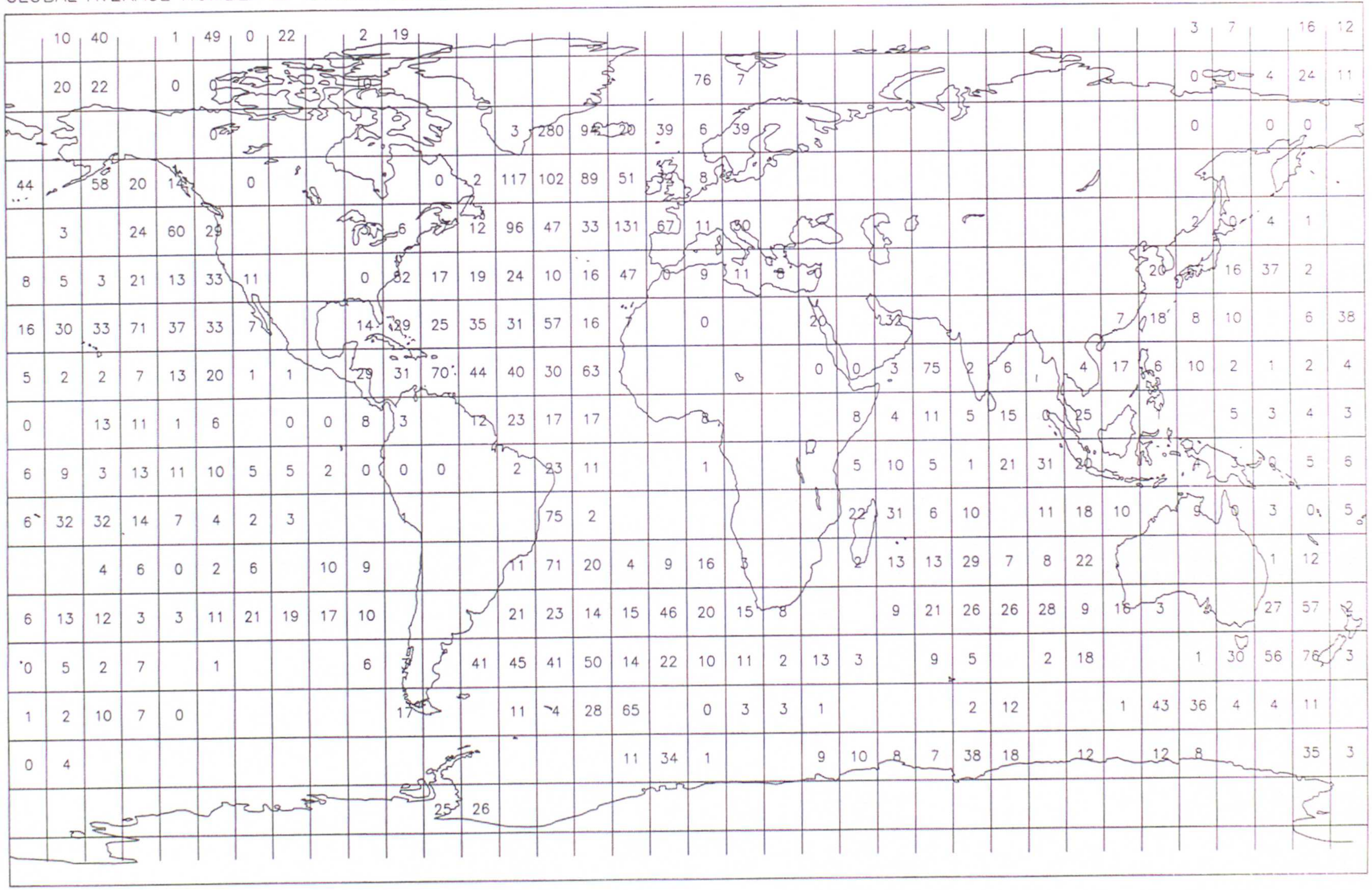

10 40 1 49 0 22 2 19 3 7 16 12
20 22 0 0 76 7 0 0 4 24 11
0 3 280 94 20 39 6 39 0 0 0
44 58 20 14 0 0 2 117 102 89 51 33 8
3 24 60 29 6 12 96 47 33 131 67 11 30 2 0 4 1
8 5 3 21 13 33 11 0 32 17 19 24 10 16 47 0 9 11 8 0 20 16 37 2
16 30 33 71 37 33 7 14 29 25 35 31 57 16 0 20 32 7 18 8 10 6 38
5 2 2 7 13 20 1 1 29 31 70 44 40 30 63 0 0 3 75 2 6 4 17 6 10 2 1 2 4
0 13 11 1 6 0 0 8 3 12 23 17 17 8 8 4 11 5 15 0 25 5 3 4 3
6 9 3 13 11 10 5 5 2 0 0 0 2 23 11 1 5 10 5 1 21 31 20 4 0 5 6
6 32 32 14 7 4 2 3 1 75 2 22 31 6 10 11 18 10 9 0 3 0 5
4 6 0 2 6 10 9 11 71 20 4 9 16 3 2 13 13 29 7 8 22 1 12
6 13 12 3 3 11 21 19 17 10 21 23 14 15 46 20 15 8 9 21 26 26 28 9 16 3 27 57 2
0 5 2 7 1 6 41 45 41 50 14 22 10 11 2 13 3 9 5 2 18 1 30 56 76 3
1 2 10 7 0 17 11 4 28 65 0 3 3 1 2 12 1 43 36 4 4 11
0 4 11 34 1 9 10 8 7 38 18 12 12 8 35 3
25 26

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for synops & autosynops.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).

Parameters monitored

:HT(m) :Station height (in metres) as given in WMO No. 9 Vol A

:RP :Pressure reporting practice
M=mean sea level pressure (hPa) reported.
S=Station level pressure reported.
8=Geopotential height (m) of 850 hPa surface reported.
7=Geopotential height (m) of 700 hPa surface reported.

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)

SELECTION CRITERIA :NOBS ≥ 20 ,and one or more of the following:

1.| bias| ≥ 4 hPa
2. SD ≥ 6 hPa
3.PGE ≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60010	28.3N	16.5W	2367	S7	85	1	1	71	2.5	-5.1	5.7
60445	36.2N	5.4E	1081	S8	109	0	0	0	0.9	4.7	4.8
60468	35.6N	6.2E	1052	S8	109	109	100	0			
60511	35.3N	1.4E	1127	S8	109	85	78	0	0.3	14.5	14.5
60535	34.7N	3.3E	1144	S8	80	2	3	0	0.6	-6.1	6.1
60670	24.6N	9.5E	1054	S8	106	4	4	0	0.8	9.6	9.6
62805	11.8N	34.4E	474	MS	69	0	0	0	1.4	-4.1	4.3
63330	13.5N	39.5E	2070	MS	38	38	100	0			
63334	10.3N	37.7E	2515	MS	60	3	5	5	1.6	10.1	10.2
63450	9.0N	38.8E	2354	MS	79	0	0	0	0.8	4.7	4.8
63471	9.6N	41.9E	1260	MS	71	0	0	1	1.4	9.5	9.6
63478	5.9N	43.6E	295	MS	36	0	0	0	1.0	6.3	6.4
68350	26.7S	27.1E	1351	S8	79	1	1	10	2.5	10.1	10.4
68396	26.5S	31.3E	641	S8	51	0	0	0	0.9	4.5	4.6
69679	43.9N	18.3E	481	M	128	46	36	0	5.1	-2.2	5.6

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
30320	56.9N	105.7E	669	MS	73	38	52	0	2.1	-0.1	2.1
38069	44.2N	66.8E	153	M	108	0	0	37	1.3	-4.1	4.3
40743	36.2N	57.7E	941	MS	102	0	0	3	1.4	-6.1	6.3
40762	35.3N	59.2E	1333	MS	101	32	32	0	0.9	-13.4	13.4
41254	23.1N	57.7E	1755	S8	87	87	100	0			
41396	16.0N	48.9E	700	MS	35	1	3	3	0.7	6.4	6.4
41535	34.2N	73.3E	1308	8	50	2	4	22	2.3	-4.9	5.4
44239	48.8N	103.6E	1209	MS	104	0	0	1	2.1	-4.5	5.0
44272	47.8N	96.9E	1761	MS	102	1	1	3	2.2	-5.4	5.8
44275	46.8N	98.1E	2255	MS	108	0	0	1	1.9	-5.6	5.9
44288	46.3N	102.8E	1813	MS	110	1	1	0	2.1	-4.3	4.8
44298	46.4N	108.2E	1287	MS	104	1	1	2	2.4	-4.7	5.3
44341	45.8N	106.3E	1396	MS	105	0	0	0	2.3	-4.3	4.9
44347	44.4N	105.3E	1297	MS	106	0	0	0	2.5	-4.4	5.1
44354	44.9N	110.1E	936	MS	110	1	1	0	2.5	-4.1	4.8
44373	43.6N	104.4E	1465	MS	109	0	0	0	2.6	-4.7	5.4
44477	27.0N	87.4E	1445	S8	45	45	100	0			
47022	40.8N	128.2E	1200	S	60	1	2	0	0.8	4.3	4.4
51495	43.5N	91.6E	874	M	119	0	0	2	1.6	6.8	7.0
52602	38.8N	93.4E	2734	S	118	0	0	0	1.6	-6.8	7.0
52866	36.6N	101.8E	2262	S	118	0	0	0	1.7	-6.3	6.5
52955	35.6N	100.8E	3201	S	118	0	0	0	1.8	8.6	8.8
53149	42.5N	110.1E	1223	MS	119	0	0	0	2.4	-4.1	4.8
53588	39.0N	113.5E	2898	S	119	119	100	0			
54587	39.1N	123.2E	5	M	88	1	1	7	2.3	-4.6	5.1
56021	34.1N	95.8E	4176	S	119	0	0	0	2.4	-7.0	7.4
56029	33.0N	97.0E	3682	S	118	0	0	0	2.2	-4.2	4.7
56106	31.9N	93.8E	4024	S	117	1	1	1	2.0	-5.3	5.7
56144	31.8N	98.6E	3184	S	115	0	0	1	2.4	-8.8	9.1
56172	31.9N	102.2E	2666	S	119	0	0	0	2.4	-4.6	5.2
56385	29.5N	103.3E	3049	S	119	0	0	39	1.6	-6.4	6.6
56444	28.5N	98.9E	3488	S	119	24	20	0	0.5	14.1	14.1
56462	29.0N	101.5E	2994	S	119	0	0	1	1.8	6.5	6.7

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	36	0	0	0	1.0	-5.7	5.8
82336	3.1S	58.4W	40	MS	83	0	0	6	2.4	-5.1	5.6
82595	5.2S	35.5W	12	M	43	0	0	84	1.2	-4.6	4.8
83214	10.3S	54.9W	285	MS	61	1	2	2	1.6	-6.1	6.3
83235	12.4S	46.4W	604	MS	84	0	0	0	0.9	5.9	6.0

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
83319	14.7S	52.4W	315	MS	83	0	0	0	1.1	-4.8	4.9
83332	14.1S	46.4W	826	MS	81	1	1	0	1.0	12.8	12.8
83408	14.3S	43.8W	447	MS	79	3	4	0	0.8	9.7	9.7
83423	16.7S	49.3W	741	MS	85	0	0	0	0.8	-5.6	5.7
83488	17.8S	42.9W	1097	MS	85	85	100	0			
83531	18.6S	46.5W	940	MS	84	0	0	0	1.0	-6.9	7.0
83587	19.9S	43.9W	850	MS	81	0	0	1	1.1	-6.6	6.7
83773	23.1S	48.9W	793	S	36	0	0	0	1.3	-5.7	5.8
83836	25.5S	50.6W	837	MS	83	0	0	54	1.4	-4.2	4.4
84401	5.2S	80.6W	49	MS	68	0	0	0	1.1	4.4	4.5
84425	5.9S	76.1W	179	MS	43	0	0	0	1.5	4.2	4.5
84455	6.5S	76.4W	281	MS	53	0	0	17	1.2	6.3	6.4
84472	7.1S	78.5W	2620	S	38	0	0	0	0.7	-6.8	6.8
84686	13.6S	72.0W	3248	S	69	0	0	0	1.0	-6.8	6.9
84782	18.1S	70.3W	468	MS	66	0	0	9	1.6	7.7	7.9
85312	19.8S	63.9W	992	S	36	2	6	94	1.4	-11.3	11.4
85406	18.3S	70.3W	55	M	115	0	0	0	1.1	5.4	5.5
85836	43.6S	71.8W	277	M	41	0	0	0	1.8	5.0	5.3

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
76118	30.4N	109.7W	1040	MS	38	0	0	0	0.6	-11.0	11.0
76625	20.6N	100.4W	1813	MS	21	0	0	0	0.8	-6.9	6.9
76632	20.1N	98.7W	2417	MS	32	1	3	3	1.4	-5.1	5.3
76658	19.2N	103.7W	494	MS	48	0	0	0	0.9	7.1	7.2
76750	18.5N	88.3W	9	MS	92	0	0	2	1.6	-7.7	7.9
76775	17.1N	96.7W	1550	MS	54	0	0	0	0.8	4.1	4.2
76845	16.7N	92.6W	2276	MS	99	99	100	0			
78718	14.4N	87.6W	626	M	41	40	98	0	0.0	-12.1	12.1

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
91163	21.9N	159.6W	7	8	349	349	100	0			
91670	17.1S	176.9E	5	M	74	0	0	89	2.3	5.8	6.2
94328	22.4S	133.6E	623	MS	112	0	0	0	0.6	6.4	6.4
94955	41.6S	145.7E	684	MS	118	118	100	0			
95909	36.5S	148.3E	1957	S	71	71	100	0			
95952	41.9S	145.6E	560	MS	116	116	100	0			
96751	6.7S	106.9E	87	S8	82	82	100	0			

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01360	61.9N	7.9E	712	MS	118	0	0	59	0.9	5.5	5.6
04207	81.7N	59.9W	105	MS	87	0	0	0	1.4	-4.1	4.3
11146	47.1N	13.0E	3105	S7	87	1	1	23	1.8	-4.0	4.4
16227	41.9N	13.6E	655	M	32	32	100	38			
16614	40.4N	21.3E	604	MS	92	0	0	0	0.8	-7.1	7.1
17092	39.8N	39.5E	1218	S8	119	0	0	0	1.1	7.4	7.5

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89272	75.0S	70.8W	1395	S	180	21	12	0	1.4	-12.5	12.6
89744	74.0S	43.0E	3353	S	206	0	0	0	1.3	4.0	4.2

TABLE 4

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:70.0 - 500.0 hPa
Elements monitored		:TEMP in °C ; WIND in m s^{-1}
Parameters monitored		
	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.
GROSS ERROR LIMITS		:10.0 °C ; 60 m s^{-1} Vector Wind
SELECTION CRITERIA		:N REP > 20

NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAA	62	0	23	2.2	1.0	58	0	22	0	5.8	1.7
AAH	40	0	23	2.4	1.1	41	0	20	0	9.4	-1.4
AAL	5940	1	25	1.8	0.1	5383	0	20	0	8.7	1.2
AAR	1310	0	8	1.9	-0.5	1304	0	10	0	9.7	0.6
ACA	1830	1	9	1.9	-0.2	1761	0	6	0	6.4	0.5
ACI	55	2	42	1.6	0.4	55	0	42	0	10.5	1.3
AEA	522	1	17	1.9	-0.4	468	0	12	0	8.6	1.1
AEL	1047	1	15	2.7	0.6	1045	0	14	0	8.6	0.9
AEY	154	0	2	1.7	0.7	155	0	3	0	9.5	0.2
AFL	432	1	10	2.0	0.5	406	1	7	0	8.0	1.1
AFR	2133	1	11	1.8	0.1	2124	0	11	0	8.3	0.9
AIH	182	1	15	1.9	0.1	175	0	11	0	8.7	0.8
AJM	82	0	5	2.0	-1.0	86	0	7	0	9.9	0.9
AMM	91	0	4	2.3	0.8	91	0	3	0	8.3	1.3
AMT	599	0	38	2.0	1.1	593	0	39	0	7.1	1.2
AMX	369	2	7	2.3	-0.4	369	0	5	0	10.5	1.4
ANA	1438	0	7	1.9	-0.2	1439	0	9	0	9.9	1.0
ANQ	26	0	4	0.8	-0.3	26	0	4	0	4.3	-0.8
ANZ	4328	1	37	1.9	0.1	4292	0	36	0	7.8	0.9
AOM	860	1	8	1.8	0.7	858	0	9	0	8.9	0.6
ARG	40	3	30	3.2	1.4	39	0	26	0	9.1	1.8
AVA	478	1	4	1.9	-0.2	487	0	5	0	8.8	0.8
AVE	216	1	5	1.6	0.7	213	0	11	0	11.8	2.1
AVN	57	2	2	1.2	0.7	58	0	2	0	7.2	0.7
AXF	108	3	35	1.6	0.4	99	0	32	0	8.0	2.5
AZA	555	1	24	2.5	0.2	491	0	18	0	9.5	0.7
BAF	46	0	11	2.2	-1.2	45	0	9	0	5.0	0.2
BAL	553	0	12	1.9	-0.4	547	0	12	0	7.4	0.9
BAW	2029	1	21	2.2	-0.4	1902	0	16	0	7.4	1.0
BLX	46	0	9	1.6	-0.3	45	0	9	0	11.0	1.3
BWA	359	2	9	2.1	1.4	350	0	7	0	8.2	0.5
CAL	1770	0	5	1.8	0.1	1782	0	7	0	9.6	0.7
CCA	245	2	100	2.6	0.6	275	0	100	0	14.1	0.2
CDN	2249	0	10	1.8	0.4	2189	0	10	0	8.8	0.4
CES	321	1	9	1.6	0.5	326	2	100	0	12.0	0.4
CFC	41	2	17	1.9	0.4	41	0	20	0	9.0	-0.5
CFG	1138	0	7	2.0	-0.8	1118	0	5	0	7.8	0.6
CKS	448	0	37	1.8	1.0	490	0	38	0	6.5	0.9
CKT	281	1	13	1.8	1.0	259	0	10	0	10.4	0.5
CLX	432	0	13	2.0	-0.5	408	1	8	0	6.8	0.2
CMI	437	2	8	1.8	0.7	436	0	7	0	9.0	1.2
CMM	445	1	10	1.7	0.1	432	0	9	0	7.6	1.2
COA	1840	1	28	2.0	0.1	1684	0	25	0	11.0	2.6
CPA	56	4	7	1.5	0.1	58	2	5	0	9.0	0.9
CRL	963	1	6	1.6	0.2	955	0	6	0	7.8	1.0
CSN	80	1	9	1.4	0.5	82	0	12	0	10.8	1.2
CTB	248	1	3	1.7	-0.4	251	0	3	0	7.2	1.0
CUB	515	0	11	2.3	0.6	504	0	11	0	10.8	0.7
DAL	4401	0	36	1.7	0.3	4108	0	34	0	7.8	0.6
DBY	705	1	4	1.8	-0.6	712	0	4	0	8.3	1.0
DLH	3322	1	14	1.9	-0.4	3095	0	11	0	7.4	0.9
EEZ	56	2	30	2.4	-1.5	54	2	31	0	11.8	1.8
EIA	321	1	35	2.3	0.7	304	0	34	0	8.0	1.5
ELY	153	2	16	1.8	-0.4	150	1	9	0	9.0	0.6
EVA	2055	0	5	1.7	-0.1	2085	0	6	0	9.0	0.6
EWW	101	1	21	1.7	0.3	89	0	17	0	7.9	2.0
FDX	1660	1	22	1.7	0.5	1581	0	20	0	8.5	1.0
FIN	395	2	22	1.9	0.4	326	0	12	0	8.3	0.9
FJI	1118	3	34	1.8	0.7	1095	0	32	0	9.5	0.6

		TEMPERATURE				WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
FOM	300	4	34	1.6	0.1	290	0	32	0	7.6	0.1
GAF	55	2	33	2.3	-1.3	45	0	16	0	7.6	1.9
GHA	76	1	16	2.0	0.2	71	0	11	0	11.0	2.8
GIA	50	0	24	2.2	1.3	51	0	25	0	13.3	-1.6
GTI	95	0	22	2.3	0.7	90	0	21	0	10.3	0.8
HAL	3259	0	33	1.4	0.3	3219	0	34	0	8.9	1.3
HLF	99	0	18	2.0	-0.9	90	1	10	0	7.9	1.3
HRH	122	7	56	2.1	0.6	114	0	52	0	9.4	0.8
IBE	3184	1	21	2.1	0.4	3070	0	19	0	9.4	1.0
ICE	1157	1	19	1.9	0.0	985	0	12	0	6.4	0.6
IWD	58	0	21	2.0	-0.9	53	2	19	0	10.1	2.4
JAL	6561	0	4	1.9	0.2	6541	0	5	0	9.1	1.0
JKK	204	1	27	2.0	0.0	175	0	18	0	10.2	0.6
KAL	3790	1	8	1.9	-0.1	3772	0	9	0	9.5	0.8
KLM	3257	0	16	1.8	0.1	3126	0	14	0	7.6	0.9
LAN	40	3	10	3.2	0.4	41	0	15	0	12.7	1.2
LAP	24	4	13	3.0	1.4	24	0	13	0	15.5	0.8
LDA	109	2	17	1.5	0.2	100	0	13	0	10.1	0.5
LDI	667	0	22	2.1	-1.0	615	0	17	0	8.0	0.7
LGL	50	0	8	2.8	-1.9	49	0	8	0	7.8	-0.9
LIB	507	1	3	2.0	1.0	506	0	3	0	7.7	0.8
LOT	219	0	15	2.1	-1.0	195	1	11	0	7.8	0.2
LTU	765	0	22	1.9	-0.3	682	0	14	0	8.0	0.9
LXR	100	0	3	1.9	0.5	100	0	4	0	9.6	1.4
MAS	425	0	8	1.9	0.1	446	0	9	0	9.0	0.9
MDA	92	0	2	1.7	-0.7	90	0	6	0	10.6	-1.2
MON	31	3	23	2.0	0.7	28	0	18	0	8.6	-1.6
MPD	262	2	7	2.0	0.8	250	0	6	0	10.0	1.5
MPH	680	1	8	1.9	-0.7	653	0	5	0	7.8	1.0
NCA	689	1	3	1.7	0.1	683	0	4	0	8.7	0.7
NWA	10701	1	12	1.9	0.8	10376	0	11	0	8.5	0.7
OAL	38	0	18	3.2	1.8	35	0	14	0	7.5	0.7
PAC	218	0	25	1.8	0.0	200	0	23	0	8.4	0.7
PAL	990	0	4	1.7	0.1	962	0	5	0	8.4	0.7
PAO	320	3	45	1.8	0.4	315	1	44	0	9.5	1.8
QFA	2466	1	51	1.9	0.2	2453	0	51	0	8.6	0.7
RAF	69	1	4	1.9	1.4	69	0	4	0	9.6	0.0
RAM	87	1	8	2.3	-0.6	86	0	8	0	10.5	1.2
RCH	618	1	22	2.2	0.7	589	0	100	0	11.2	2.0
RJA	22	0	27	2.4	-1.5	21	5	19	0	10.8	1.3
RKA	102	2	3	1.5	-0.6	98	1	3	0	7.8	0.1
ROY	40	5	25	2.5	-0.1	37	0	22	0	8.4	0.7
RRR	80	1	10	1.8	-0.1	75	0	8	0	4.8	0.8
RYN	440	1	39	1.6	0.9	444	0	38	0	6.4	0.4
RZO	110	2	8	2.6	0.4	109	0	6	0	10.0	0.9
SAA	258	0	1	1.7	0.0	258	0	1	0	7.3	0.4
SAB	51	2	16	2.2	0.2	51	0	12	0	7.6	-0.7
SAS	1656	0	1	1.7	-0.5	1639	0	2	0	7.1	0.5
SCX	22	0	45	1.0	0.8	26	0	42	0	5.5	-1.7
SEU	97	4	15	2.6	1.4	87	0	7	0	10.9	-0.5
SIA	1190	0	6	1.8	-0.2	1172	0	6	0	8.3	0.7
SLR	202	0	18	1.6	-0.4	202	0	18	0	9.1	0.2
SOL	61	0	2	1.2	0.8	61	0	2	0	6.0	1.0
SVA	113	0	12	1.8	-0.1	116	1	9	0	8.3	0.4
SVV	32	13	47	5.4	3.6	32	0	16	0	14.1	0.0
SWR	148	1	20	1.6	0.0	126	0	9	0	7.1	0.1
TAP	827	1	10	1.9	-0.5	820	0	10	0	8.9	1.1
TBA	32	3	25	2.3	1.3	32	0	44	0	21.0	-0.7
TCO	21	0	5	1.5	0.2	21	0	5	0	6.6	-0.9

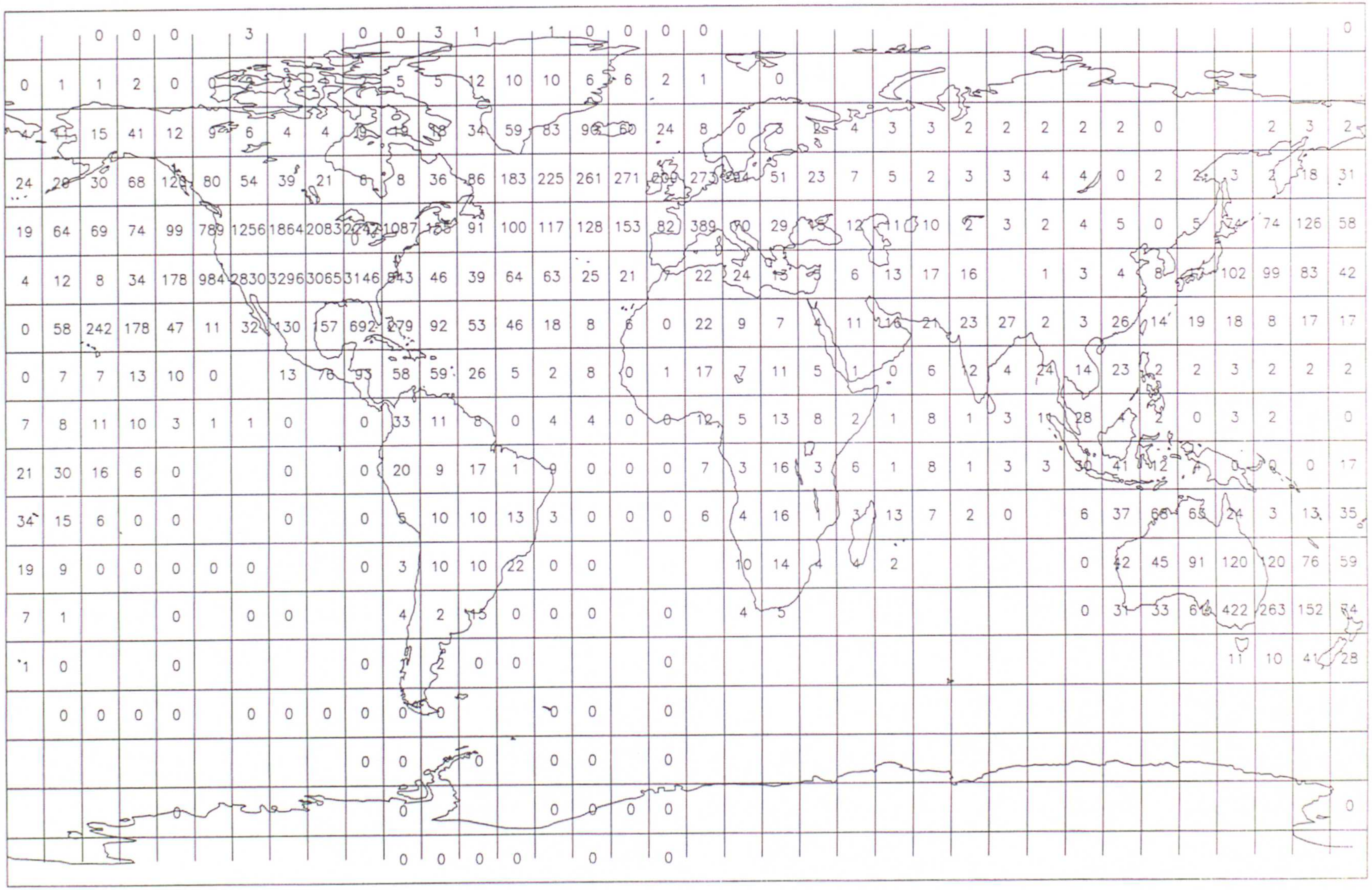
		TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
THA	530	1	5	1.7	-0.2	525	0	6	0	9.6	0.7
THT	58	3	22	2.8	1.5	56	0	20	0	10.7	2.5
TOW	159	1	30	1.9	0.2	128	0	18	0	8.2	1.4
TPA	22	0	14	1.6	0.0	22	0	14	0	6.8	0.5
TSC	40	0	35	2.5	0.5	32	0	22	0	13.0	1.4
TWA	1719	0	28	2.1	0.1	1470	0	21	0	9.6	1.4
UAL	89346	1	86	1.5	0.0	89105	0	86	0	6.7	0.9
UPS	1552	1	36	1.7	0.2	1481	0	35	0	7.2	0.7
USA	257	0	26	2.2	0.0	203	0	18	0	9.5	2.3
VIR	458	1	12	2.0	-0.6	427	0	9	0	9.4	0.9
VKG	96	0	11	1.7	0.5	90	0	7	0	9.5	1.2
VPB	20	0	5	2.5	0.9	20	0	10	0	17.3	6.8
VRG	155	8	21	2.8	1.0	154	1	100	0	14.0	1.1
VSP	29	0	21	1.6	0.8	30	0	20	0	11.0	0.9
VVR	51	0	33	2.3	-0.1	66	0	42	0	11.3	1.8
WOA	89	0	6	2.1	1.1	100	0	10	0	11.8	-0.1
ZKN	2264	0	1	1.3	-0.1	2264	0	1	0	5.9	1.0
AN	25948	0	1	1.4	0.3	25948	0	1	0	5.6	0.7
AR	3383	2	90	2.9	2.6	3376	0	13	0	7.7	1.4
BA	33584	0	1	1.4	0.2	33497	0	1	0	5.8	0.8
IT	384	0	52	1.2	0.0	383	0	52	0	6.0	-0.1
KL	9465	0	5	1.8	1.1	9458	0	5	0	6.2	0.9
LH	219	0	2	2.2	1.4	261	0	5	0	8.8	0.9
MK	3008	0	37	2.3	2.0	3000	0	1	0	6.7	0.7
OZ	67	3	42	2.5	-0.4	66	5	47	0	14.2	0.6
QF	21123	0	4	1.5	0.7	21117	0	3	0	6.1	0.7
SA	3960	0	1	2.1	1.6	3952	0	1	0	6.7	1.4
SK	632	0	1	1.3	-0.3	632	0	0	0	4.9	0.5
SV	1484	5	19	3.0	0.4	1470	0	79	0	16.0	5.0
UA	1836	1	17	1.9	0.1	2003	0	17	0	9.4	2.0
WA	463	7	14	1.9	0.8	457	4	100	0	14.8	-2.7
XX	3892	1	7	1.7	0.5	4518	0	100	0	12.3	0.9
N	705	1	25	2.8	-0.1	699	0	23	0	8.9	1.4
ADS	1063	0	1	1.4	0.1	1063	0	1	0	5.7	0.7
US ACARS	542182	0	13	1.5	0.3	542195	0	14	0	6.7	1.0

MEAN DAILY COUNT OF AIRCRAFT 70 - 500 HPA

APRIL 1999

OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

FIGURE 3


0 0 0 3 0 0 3 1 1 0 0 0 0 0
0 1 1 2 0 0 5 5 12 10 10 6 6 2 1 0
4 11 15 41 12 9 6 4 4 19 19 18 34 59 83 96 60 24 8 0 3 2 4 3 3 2 2 2 2 2 0 2 3 2
24 28 30 68 120 80 54 39 21 6 8 36 86 183 225 261 271 209 273 214 51 23 7 5 2 3 3 4 4 0 2 2 3 2 18 31
19 64 69 74 99 789 1256 1864 2083 2242 1087 155 91 100 117 128 153 82 389 70 29 15 12 11 10 2 3 2 4 5 0 5 74 74 126 58
4 12 8 34 178 984 2830 3296 3065 3146 843 46 39 64 63 25 21 7 22 24 13 5 6 13 17 16 1 3 4 8 102 99 83 42
0 58 242 178 47 11 32 130 157 692 279 92 53 46 18 8 6 0 22 9 7 4 11 16 21 23 27 2 3 26 14 19 18 8 17 17
0 7 7 13 10 0 13 76 93 58 59 26 5 2 8 0 1 17 7 11 5 1 0 6 12 4 24 14 23 2 2 3 2 2 2
7 8 11 10 3 1 1 0 0 33 11 8 0 4 4 0 0 12 5 13 8 2 1 8 1 3 11 28 4 2 0 3 2 0
21 30 16 6 0 0 0 20 9 17 1 9 0 0 0 7 3 16 3 6 1 8 1 3 3 30 41 12 4 0 0 0 17
34 15 6 0 0 0 0 5 10 10 13 3 0 0 0 6 4 16 1 3 13 7 2 0 6 37 68 65 24 3 13 35
19 9 0 0 0 0 0 0 3 10 10 22 0 0 10 14 4 4 2 0 42 45 91 120 120 76 59
7 1 0 0 0 4 2 15 0 0 0 0 4 5 0 31 33 61 422 263 152 54
1 0 0 0 2 0 0 0 11 10 41 28
0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0
0 0 0 0 0 0 0
0 0 0 0 0 0

AIRCRAFT MEAN WINDS BETWEEN 70 AND 500 HPA

FIGURE 4

APRIL 1999

OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT

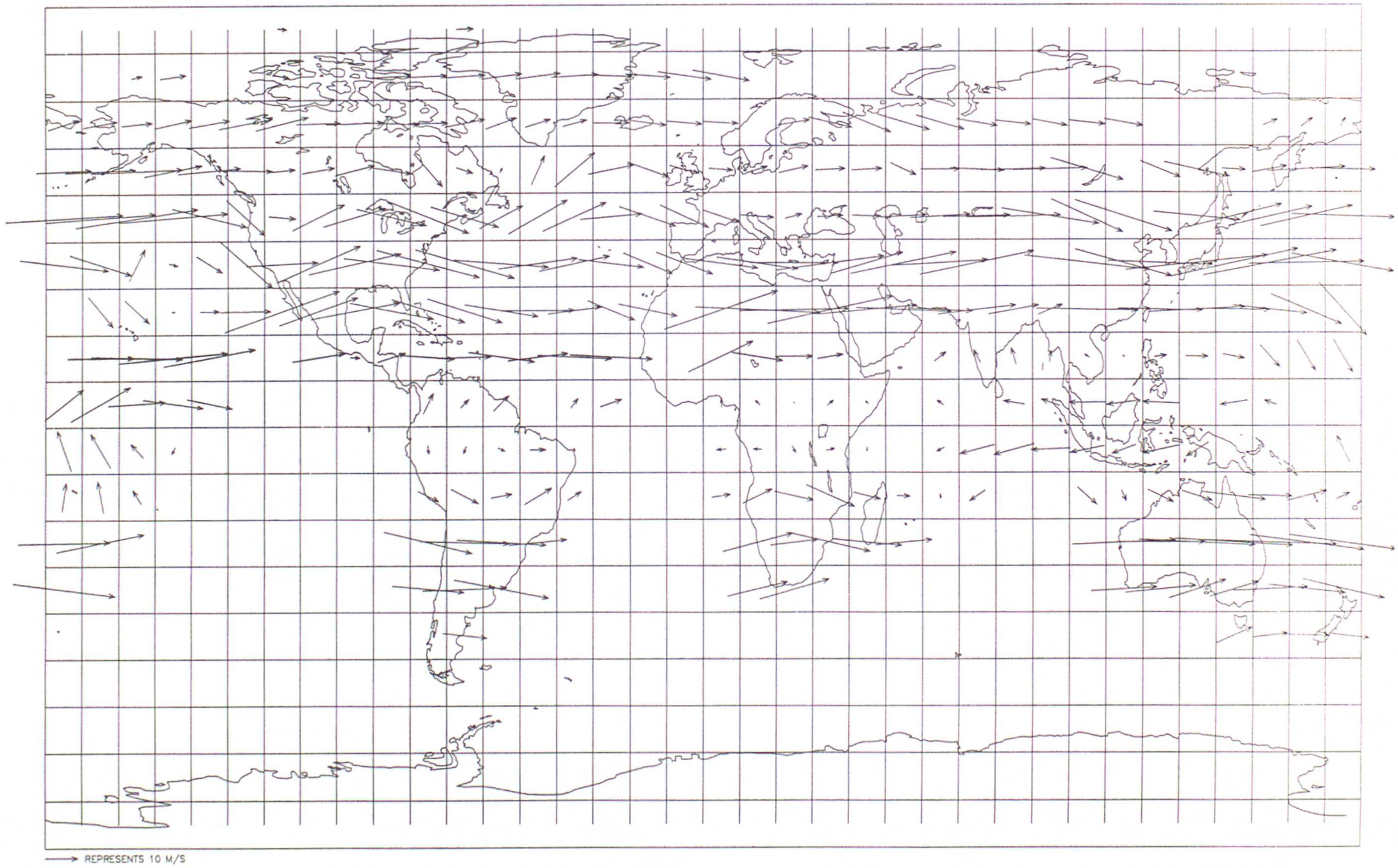
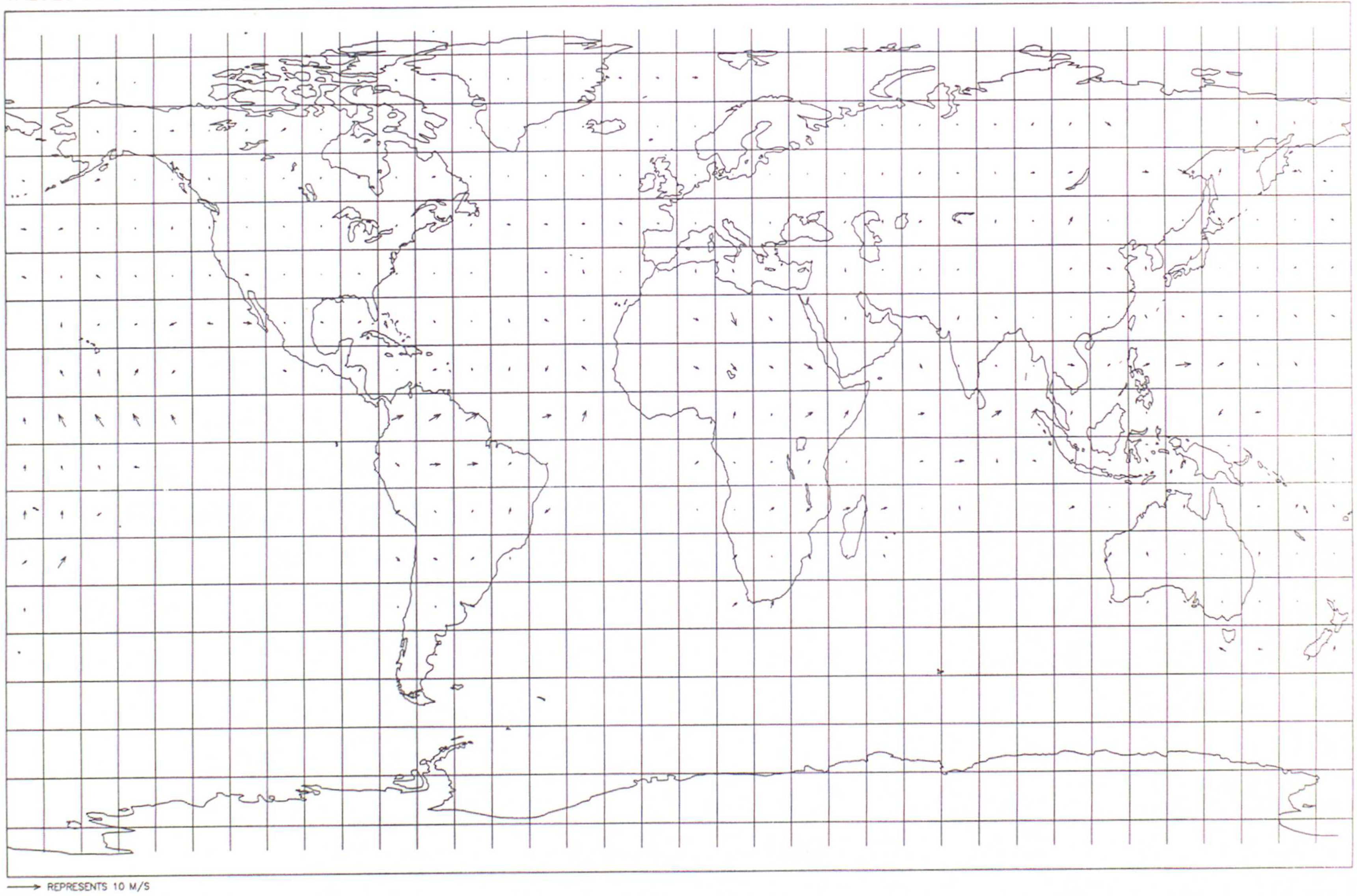
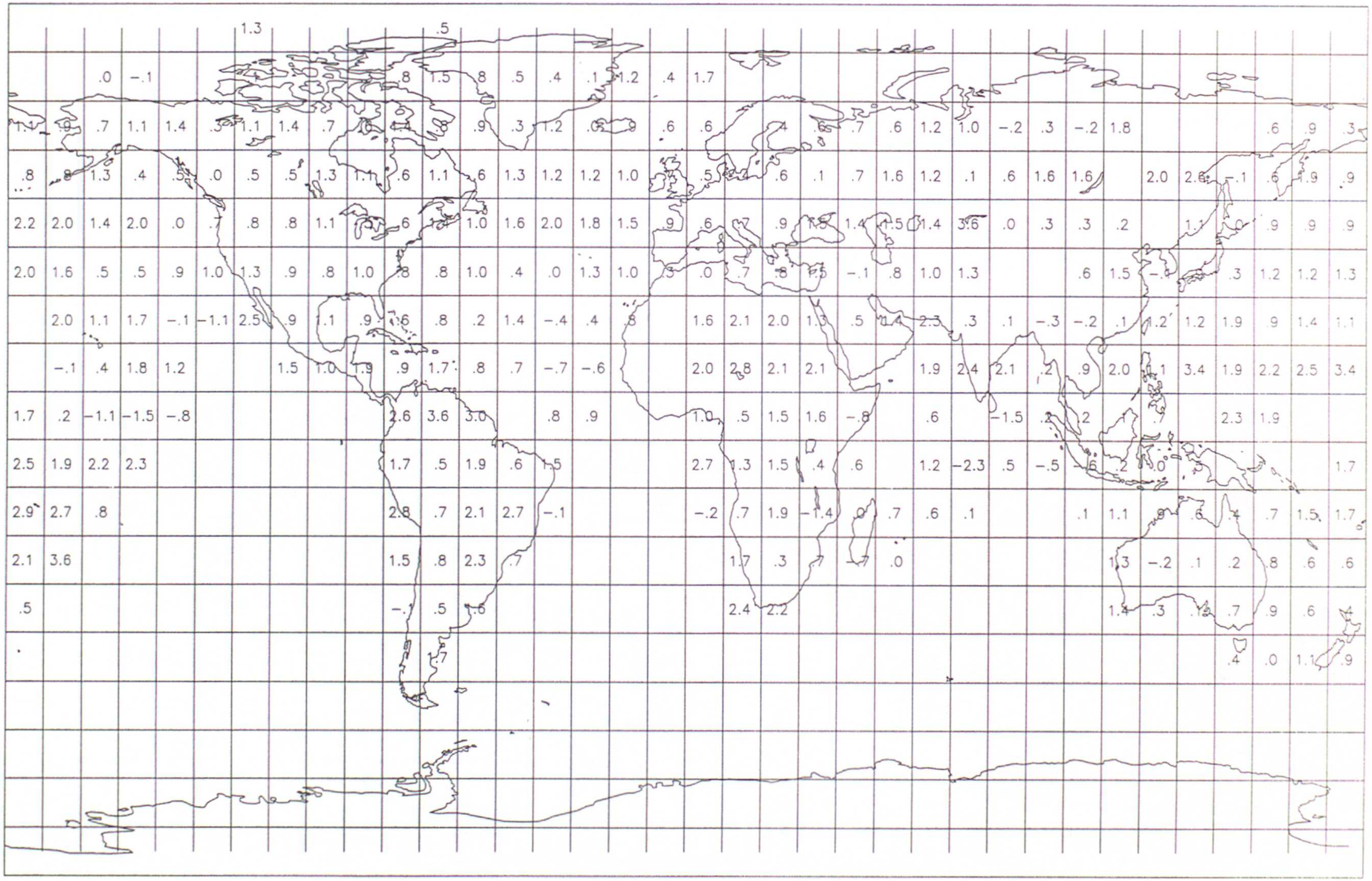


FIGURE 5

AIRCRAFT MEAN O–B WINDS BETWEEN 70 AND 500 HPA
APRIL 1999
OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



AIRCRAFT : MEAN O–B SPEEDS (M/S) BETWEEN 70 AND 500 HPA FIGURE 6
APRIL 1999
OBSERVATIONS WITH O–B VECTOR DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


1.3 .5
.0 −.1 .8 1.5 .8 .5 .4 .1 1.2 .4 1.7
1.1 .9 .7 1.1 1.4 .3 1.1 1.4 .7 .6 1.4 .8 .9 .3 1.2 .6 .9 .6 .6 .4 .6 .7 .6 1.2 1.0 −.2 .3 −.2 1.8 .6 .9 .3
.8 .8 1.3 .4 .5 .0 .5 .5 1.3 1.1 .6 1.1 .6 1.3 1.2 1.2 1.0 .5 .6 .1 .7 1.6 1.2 .1 .6 1.6 1.6 2.0 2.6 −.1 .6 1.9 .9
2.2 2.0 1.4 2.0 .0 .7 .8 .8 1.1 .6 .6 1.0 1.6 2.0 1.8 1.5 .9 .6 .7 .9 1.5 1.4 1.5 1.4 3.6 .0 .3 .3 .2 1.1 .0 .9 .9 .9
2.0 1.6 .5 .5 .9 1.0 1.3 .9 .8 1.0 .8 .8 1.0 .4 .0 1.3 1.0 .3 .0 .7 .8 1.5 −.1 .8 1.0 1.3 .6 1.5 −.4 .3 1.2 1.2 1.3
2.0 1.1 1.7 −.1 −1.1 2.5 .9 1.1 .9 .6 .8 .2 1.4 −.4 .4 .8 1.6 2.1 2.0 1.3 .5 1.4 2.3 .3 .1 −.3 −.2 .1 1.2 1.2 1.9 .9 1.4 1.1
−.1 .4 1.8 1.2 1.5 1.0 1.9 .9 1.7 .8 .7 −.7 −.6 2.0 2.8 2.1 2.1 1.9 2.4 2.1 .2 .9 2.0 .1 3.4 1.9 2.2 2.5 3.4
1.7 .2 −1.1 −1.5 −.8 2.6 3.6 3.0 .8 .9 1.0 .5 1.5 1.6 −.8 .6 −1.5 .2 .2 .7 2.3 1.9
2.5 1.9 2.2 2.3 1.7 .5 1.9 .6 1.5 2.7 1.3 1.5 .4 .6 1.2 −2.3 .5 −.5 .6 .2 .0 .5 1.7
2.9 2.7 .8 2.8 .7 2.1 2.7 −.1 −.2 .7 1.9 −1.4 .0 .7 .6 .1 .1 1.1 .9 .6 .4 .7 1.5 1.7
2.1 3.6 1.5 .8 2.3 .7 1.7 .3 .7 −.7 .0 1.3 −.2 .1 .2 .8 .6 .6
.5 −.1 .5 1.6 2.4 2.2 1.4 .3 .3 .7 .9 .6 .4
.7 .4 .0 1.1 .9

AIRCRAFT : RMS O-B VECTOR (M/S) BETWEEN 70 AND 500 HPA FIGURE 7

APRIL 1999

OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

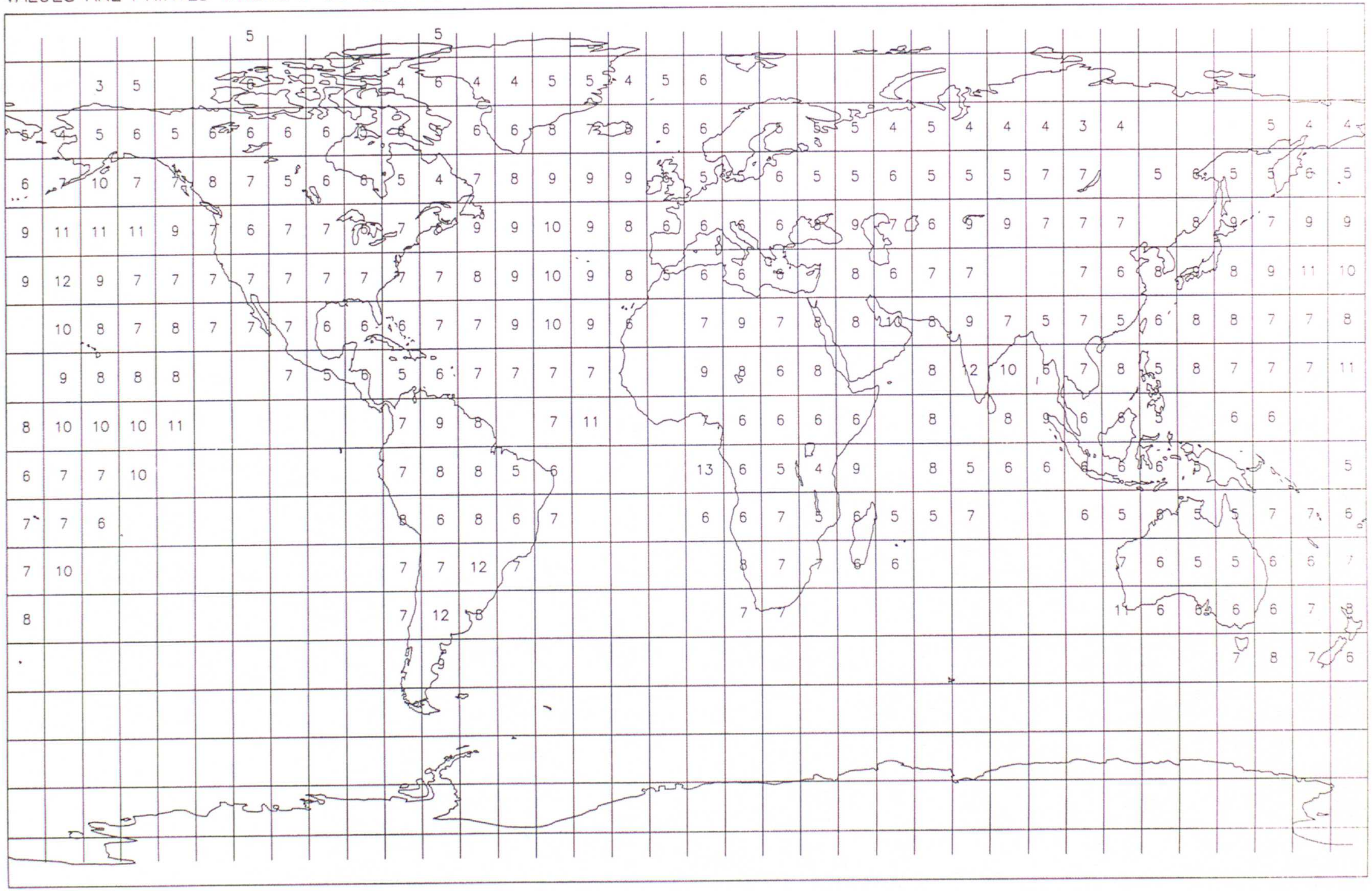

5 5
3 5 6 4 6 4 4 5 5 4 5 6
5 4 5 6 5 6 6 6 6 6 6 6 6 8 7 8 6 6 5 5 5 4 5 4 4 4 3 4 5 4 4
6 7 10 7 7 8 7 5 6 6 5 4 7 8 9 9 9 8 5 6 5 5 6 5 5 5 7 7 5 6 5 5 6 5
9 11 11 11 9 7 6 7 7 6 7 9 9 10 9 8 6 6 6 6 6 9 7 6 9 9 7 7 7 8 9 7 9 9
9 12 9 7 7 7 7 7 7 7 7 7 8 9 10 9 8 5 6 6 6 7 8 6 7 7 7 6 8 8 9 11 10
10 8 7 8 7 7 7 6 6 6 7 7 9 10 9 6 7 9 7 8 8 10 8 9 7 5 7 5 6 8 8 7 7 8
9 8 8 8 7 5 6 5 6 7 7 7 7 9 8 6 8 8 12 10 6 7 8 5 8 7 7 7 11
8 10 10 10 11 7 9 8 7 11 7 6 6 6 6 8 8 9 6 8 5 6 6
6 7 7 10 7 8 8 5 6 13 6 5 4 9 8 5 6 6 6 6 6 5
7 7 6 8 6 8 6 7 6 6 7 5 6 5 5 7 6 5 8 5 5 7 7 6
7 10 7 7 12 7 8 7 7 6 6 7 6 5 5 6 6 7
8 7 12 8 7 7 11 6 6 6 6 7 8
7 8 7 6

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 30.0 hPa

Element monitored :GEOPOTENTIAL HEIGHT IN metres

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown duringperiod.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:SD :SD of difference of observations from background values at level shown excluding those with gross errors.

:BIAS :Mean difference of observations from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.1

SELECTION CRITERIA : ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
28698	12	Z	200	55/ 73	18	0	52.6	88.7	103.1	5
33946	00	Z	100	45/ 34	16	0	23.2	125.7	127.8	5
42027	12	Z	1000	34/ 75	20	1	31.6	-58.0	66.1	5
42101	00	Z	200	30/ 76	20	4	66.7	-83.8	107.2	9
42182	12	Z	100	29/ 77	20	0	65.3	102.6	121.6	5
42314	12	Z	100	27/ 95	15	0	109.1	-44.6	117.8	6
42339	00	Z	200	26/ 73	19	0	92.7	62.4	111.8	5
42339	12	Z	200	26/ 73	17	0	60.3	79.0	99.4	4
42361	12	Z	100	26/ 78	16	1	67.7	111.4	130.4	4
42369	00	Z	150	27/ 81	16	1	75.4	107.9	131.6	7
42369	12	Z	150	27/ 81	16	2	116.4	74.1	138.0	8
42492	12	Z	100	26/ 85	22	2	89.3	102.0	135.6	4
42647	12	Z	100	23/ 73	8	2	88.0	174.1	195.1	7
42667	12	Z	100	23/ 77	20	0	75.2	156.6	173.7	5
42724	00	Z	150	24/ 91	10	1	105.8	50.3	117.2	6
42809	12	Z	200	23/ 88	23	0	74.0	47.6	88.0	5
42867	12	Z	100	21/ 79	22	0	102.0	93.7	138.5	4
42874	12	Z	100	21/ 82	19	0	104.5	83.1	133.5	4
42971	00	Z	100	20/ 86	22	0	102.3	91.0	136.9	4
42971	12	Z	200	20/ 86	25	0	76.3	51.2	91.9	5
43003	12	Z	250	19/ 73	18	2	64.5	92.1	112.4	7
43185	00	Z	100	16/ 81	23	0	114.3	-51.5	125.3	4
43279	12	Z	150	13/ 80	20	0	75.5	98.9	124.5	6
43285	12	Z	100	13/ 75	10	0	98.4	110.1	147.7	5
43295	12	Z	150	13/ 78	15	0	118.0	-7.9	118.3	7
43311	00	Z	300	11/ 73	25	0	60.5	-30.6	67.8	4
43369	00	Z	100	8/ 73	19	1	69.4	-163.2	177.4	7
47058	00	Z	200	39/ 126	9	1	59.8	90.1	108.2	4
53463	00	Z	1000	41/ 112	29	0	29.9	-11.9	32.2	5
53463	12	Z	1000	41/ 112	30	0	29.8	-28.1	41.0	5
53513	12	Z	1000	41/ 107	29	1	27.4	-41.9	50.1	5
54135	12	Z	100	44/ 122	27	0	57.9	98.4	114.2	5
54161	00	Z	100	44/ 125	28	0	39.4	100.8	108.2	4
62306	12	Z	250	31/ 27	22	0	28.6	86.8	91.4	5
65578	12	Z	30	5/ -4	16	0	41.3	200.7	205.0	4
72376	00	Z	1000	37/-108	28	1	22.5	40.2	46.1	5
72376	12	Z	400	37/-108	27	1	78.0	9.0	78.5	6
82824	12	Z	100	-9/ -64	27	0	46.7	126.0	134.4	4
89512	00	Z	1000	-71/ 12	16	12	7.1	92.3	92.5	10
89512	12	Z	1000	-71/ 12	6	7	4.9	85.0	85.1	10
96935	00	Z	200	-7/ 113	23	1	97.7	-37.3	104.6	4
97180	00	Z	400	-5/ 120	14	3	69.3	-13.6	70.6	5

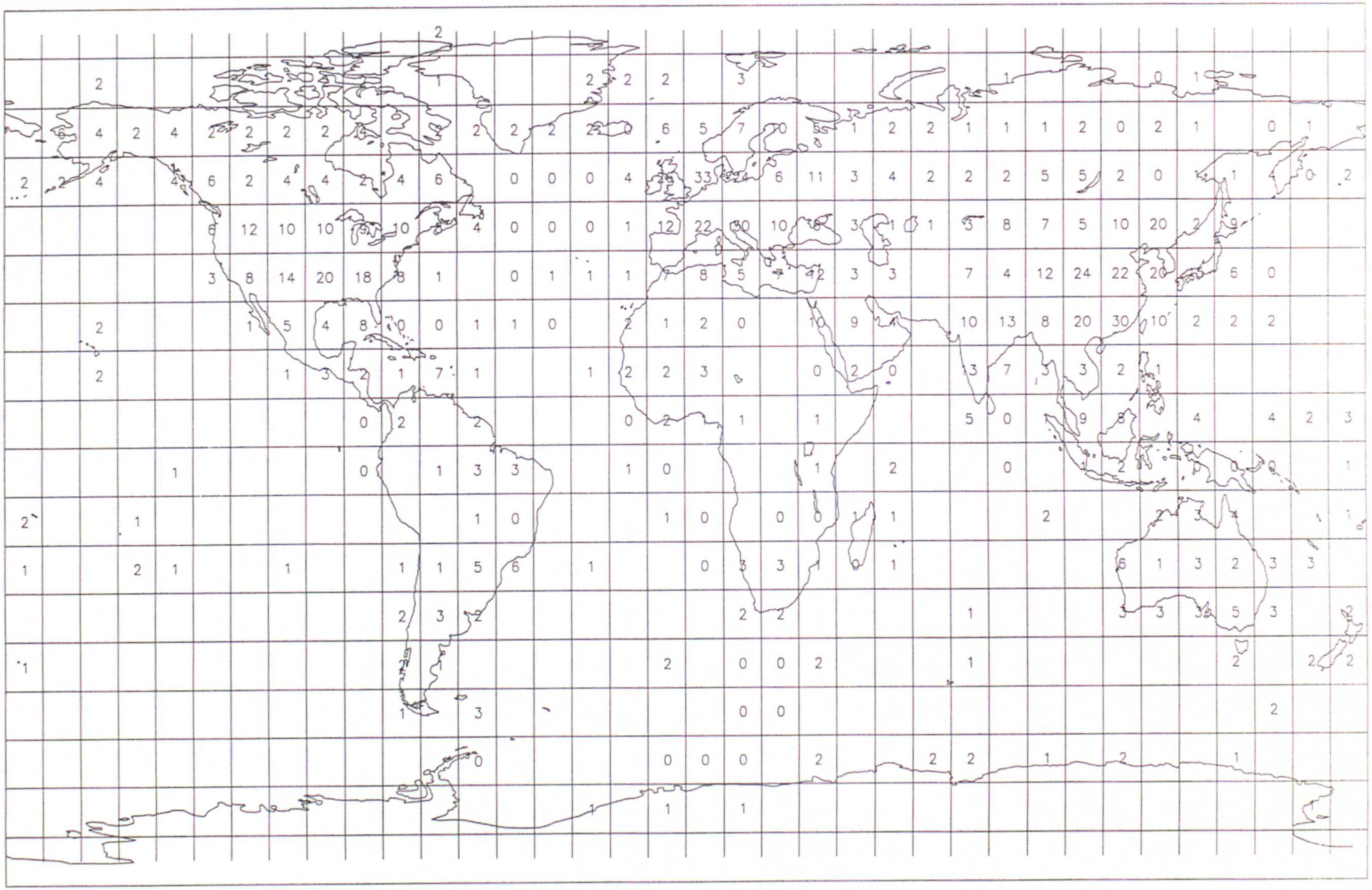
AVAILABILITY – TEMP – 500 HPA GEOPOTENTIAL – APRIL 1999

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1125

FIGURE 8


2
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6 4 2 4 2 2 2 2 2 2 2 2 23 6 5 7 10 5 1 2 2 1 1 1 2 0 2 1 0 1
2 2 4 4 6 2 4 4 2 4 6 0 0 0 4 26 33 24 6 11 3 4 2 2 2 5 5 2 0 1 1 1 0 2
6 12 10 10 9 10 4 0 0 0 1 12 22 30 10 8 3 1 1 3 8 7 5 10 20 2 9
3 8 14 20 18 8 1 0 1 1 1 7 8 5 7 42 3 3 7 4 12 24 22 20 6 0
2 1 5 4 8 0 0 1 1 0 2 1 2 0 10 9 4 10 13 8 20 30 10 2 2 2
2 1 3 2 1 7 1 1 2 2 3 0 2 0 13 7 3 3 2 1
0 2 2 0 2 1 1 5 0 9 8 4 4 2 3
1 0 1 3 3 1 0 1 2 0 2 0 1
2 1 1 0 1 0 0 0 1 1 2 2 3 4 1
1 2 1 1 1 1 5 6 1 0 3 3 1 0 1 6 1 3 2 3 3
2 3 2 2 2 1 3 3 3 5 3 2
1 1 2 0 0 2 1 2 2 2
1 3 0 0 2
0 0 0 0 2 2 2 1 2 1
1 1 1

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 100.0 hPa

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.2

SELECTION CRITERIA : $\geq$ 10 observations and $\geq$ 15 m s^{-1} RMS vector wind.

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
08301	00	V	250	40/ 3	28	0	46	-5.8	-1.0	16.7	3
42182	00	V	100	29/ 77	10	0	60	7.4	-1.3	15.4	1
53915	00	V	150	36/ 107	24	2	53	9.4	0.4	16.0	1
53915	12	V	150	36/ 107	26	1	59	9.8	-5.2	18.8	3
62378	12	V	150	30/ 31	18	0	44	7.6	-6.3	16.6	1

AVAILABILITY – TEMP/PILOT – 300 HPA WIND – APRIL 1999

FIGURE 9

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1225

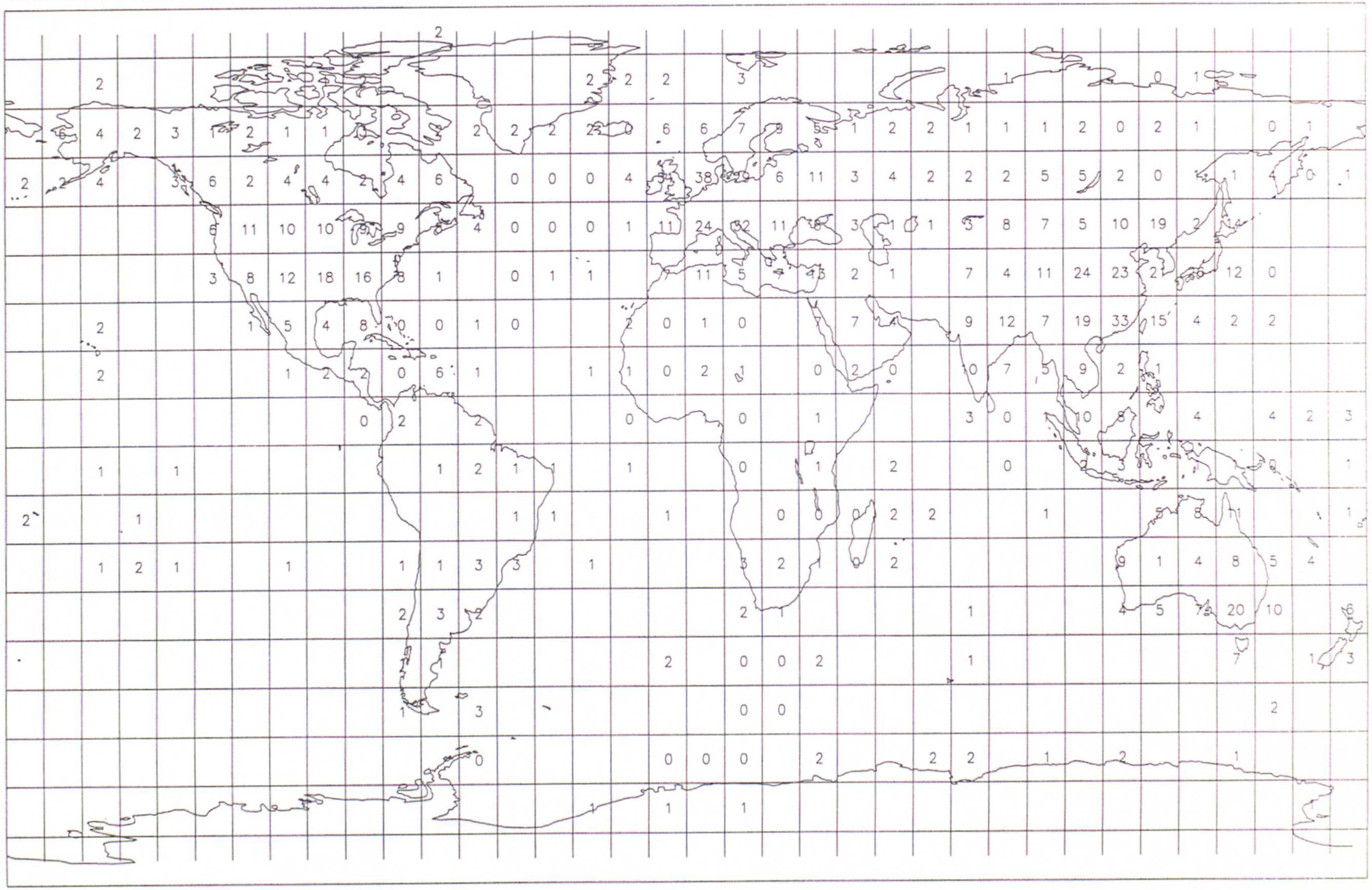

2
2 2 2 2 3 1 0 1
6 4 2 3 1 2 1 1 2 2 2 2 6 6 7 9 5 1 2 2 1 1 1 2 0 2 1 0 1
2 2 4 3 6 2 4 4 2 4 6 0 0 0 4 5 38 9 6 11 3 4 2 2 2 5 5 2 0 1 1 4 0 1
6 11 10 10 9 9 4 0 0 0 1 11 24 32 11 8 3 1 1 3 8 7 5 10 19 2 4
3 8 12 18 16 8 1 0 1 1 7 11 5 7 43 2 1 7 4 11 24 23 21 39 12 0
2 1 5 4 8 0 0 1 0 2 0 1 0 7 4 9 12 7 19 33 15 4 2 2
2 1 2 2 0 6 1 1 1 0 2 1 0 2 0 10 7 5 9 2 1
0 2 2 0 0 1 3 0 10 8 4 4 2 3
1 1 1 2 1 1 1 0 1 2 0 2 3 0 1
2 1 1 1 1 0 0 0 2 2 1 5 8 11 1 1
1 2 1 1 1 1 3 3 1 3 2 1 0 2 9 1 4 8 5 4
2 3 2 2 1 1 4 5 73 20 10 6
2 0 0 2 1 7 1 3
1 3 0 0 2
0 0 0 0 2 2 2 1 2 1
1 1 1

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 500.0 - 150.0 hPa
Element monitored		:WIND DIRECTION in degrees
Parameters monitored		
	:NUM OBS	:Average number of observations at all levels.
	:BIAS	:Mean difference of observations from background values from all levels.
	:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
	:SD	:SD of difference of observations from background values at all levels.

SELECTION CRITERIA

:NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
42339	00	DD	26/ 73	21	17.8	3.0	9.8
42339	12	DD	26/ 73	16	14.7	5.4	12.2
42701	00	DD	23/ 85	17	21.0	6.5	21.1
42701	12	DD	23/ 85	16	19.2	6.1	24.9
42809	12	DD	23/ 88	19	11.3	4.3	18.5
43185	00	DD	16/ 81	18	12.4	9.7	23.2
62721	12	DD	16/ 33	7	11.3	7.8	24.6
80001	12	DD	13/ -82	17	10.6	7.2	23.8

MONITORING OF SATELLITE WINDS

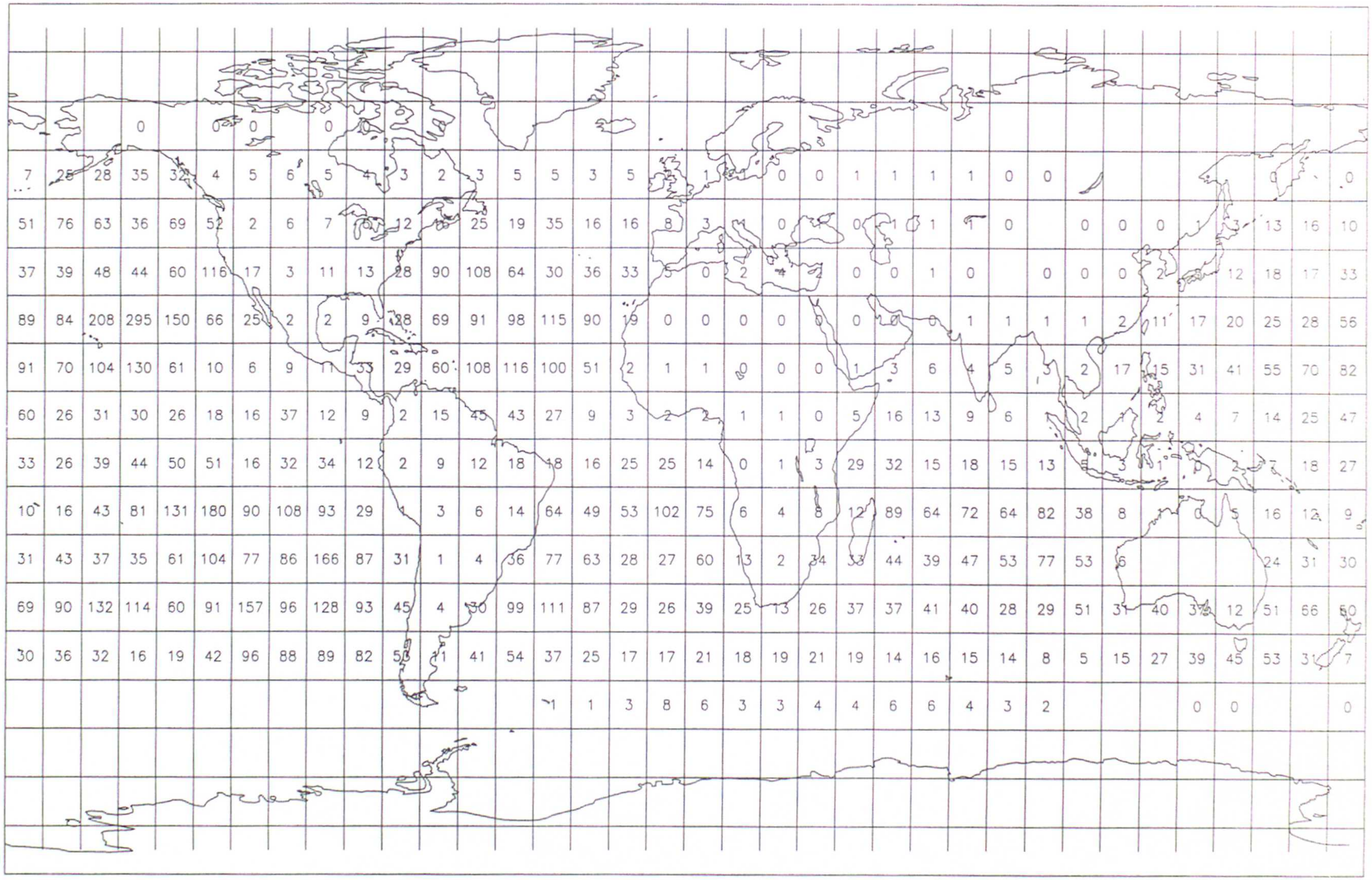
MONITORING CENTRE: BRACKNELL

MONTH: April 1999

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from GOES, METEOSAT, GMS, INSAT.
Standard of comparison	:Background field from UKMO global model.
Selection Criteria	:number of observations > 10.
Data Extracted	:Layer 701 - 1000 hPa 401 - 700 hPa 101 - 400 hPa
	:Mean wind
	:Mean observation minus background vector wind differences
	:Mean observation minus background speed differences
	:RMS of observation minus background vector differences

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 701 AND 1000 HPA FIGURE 10
APRIL 1999



			0		0	0		0																											
7	25	28	35	32	4	5	6	5	4	3	2	3	5	5	3	5		1		0	0	1	1	1	1	0	0						0		0
51	76	63	36	69	52	2	6	7	6	12	15	25	19	35	16	16	8	3	1	0	1	0	1	1	1	0		0	0	0	1	3	13	16	10
37	39	48	44	60	116	17	3	11	13	28	90	108	64	30	36	33	5	0	2	4	2	0	0	1	0		0	0	0	2	8	12	18	17	33
89	84	208	295	150	66	25	2	2	9	28	69	91	98	115	90	19	0	0	0	0	0	0	0	0	1	1	1	1	2	11	17	20	25	28	56
91	70	104	130	61	10	6	9	11	33	29	60	108	116	100	51	2	1	1	0	0	0	1	3	6	4	5	3	2	17	15	31	41	55	70	82
60	26	31	30	26	18	16	37	12	9	2	15	45	43	27	9	3	2	2	1	1	0	5	16	13	9	6	1	2	1	2	4	7	14	25	47
33	26	39	44	50	51	16	32	34	12	2	9	12	18	18	16	25	25	14	0	1	3	29	32	15	18	15	13	5	3	1	0	2	7	18	27
10	16	43	81	131	180	90	108	93	29	1	3	6	14	64	49	53	102	75	6	4	8	12	89	64	72	64	82	38	8	1	0	5	16	12	9
31	43	37	35	61	104	77	86	166	87	31	1	4	36	77	63	28	27	60	13	2	34	33	44	39	47	53	77	53	6				24	31	30
69	90	132	114	60	91	157	96	128	93	45	4	30	99	111	87	29	26	39	25	13	26	37	37	41	40	28	29	51	31	40	37	12	51	66	50
30	36	32	16	19	42	96	88	89	82	56	11	41	54	37	25	17	17	21	18	19	21	19	14	16	15	14	8	5	15	27	39	45	53	31	7
														1	1	3	8	6	3	3	4	4	6	6	4	3	2				0	0			0

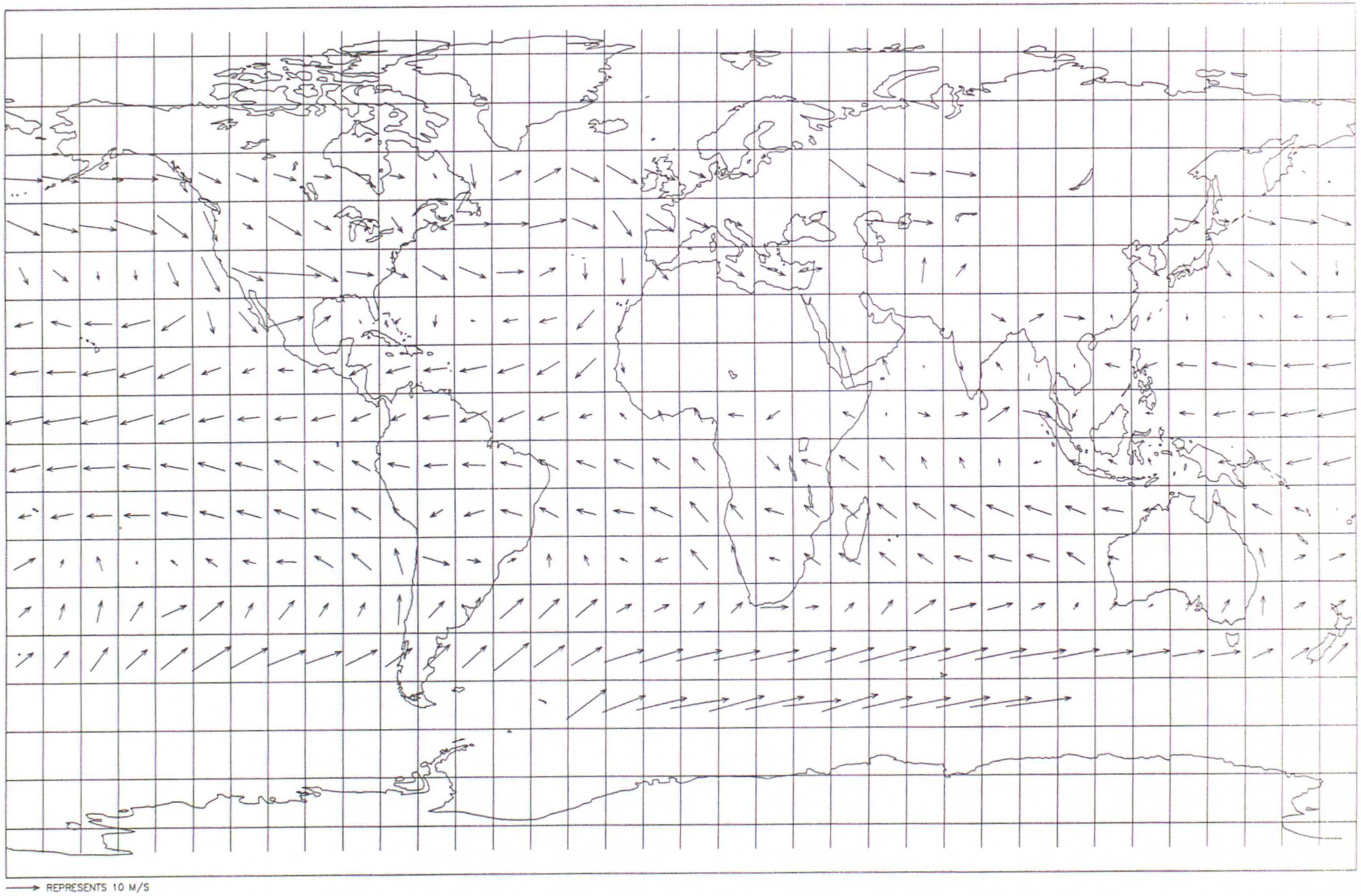
SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 701–1000 HPA

APRIL 1999

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

FIGURE 11


REPRESENTS 10 M/S

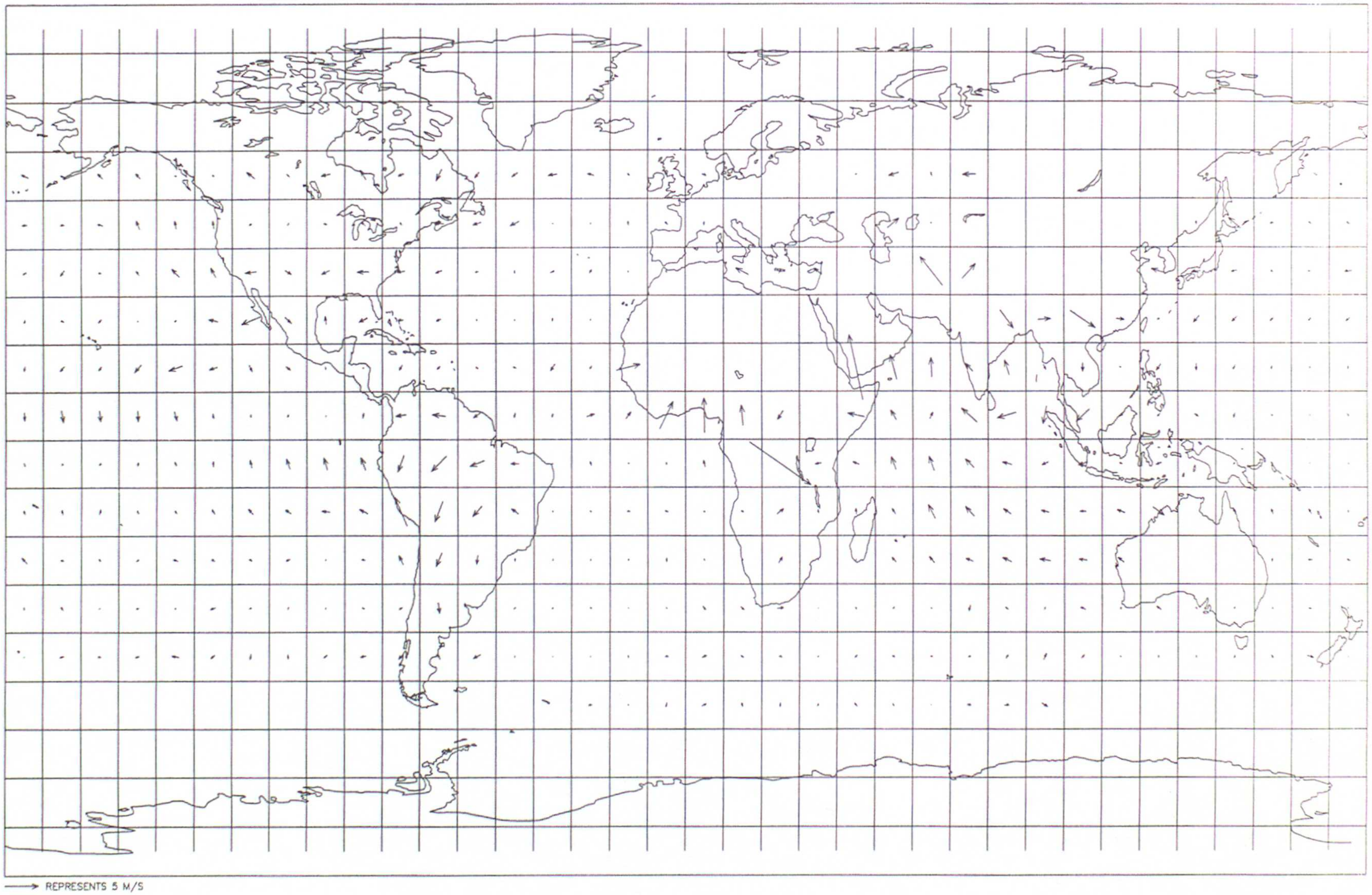
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 701-1000 HPA

FIGURE 12

APRIL 1999

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

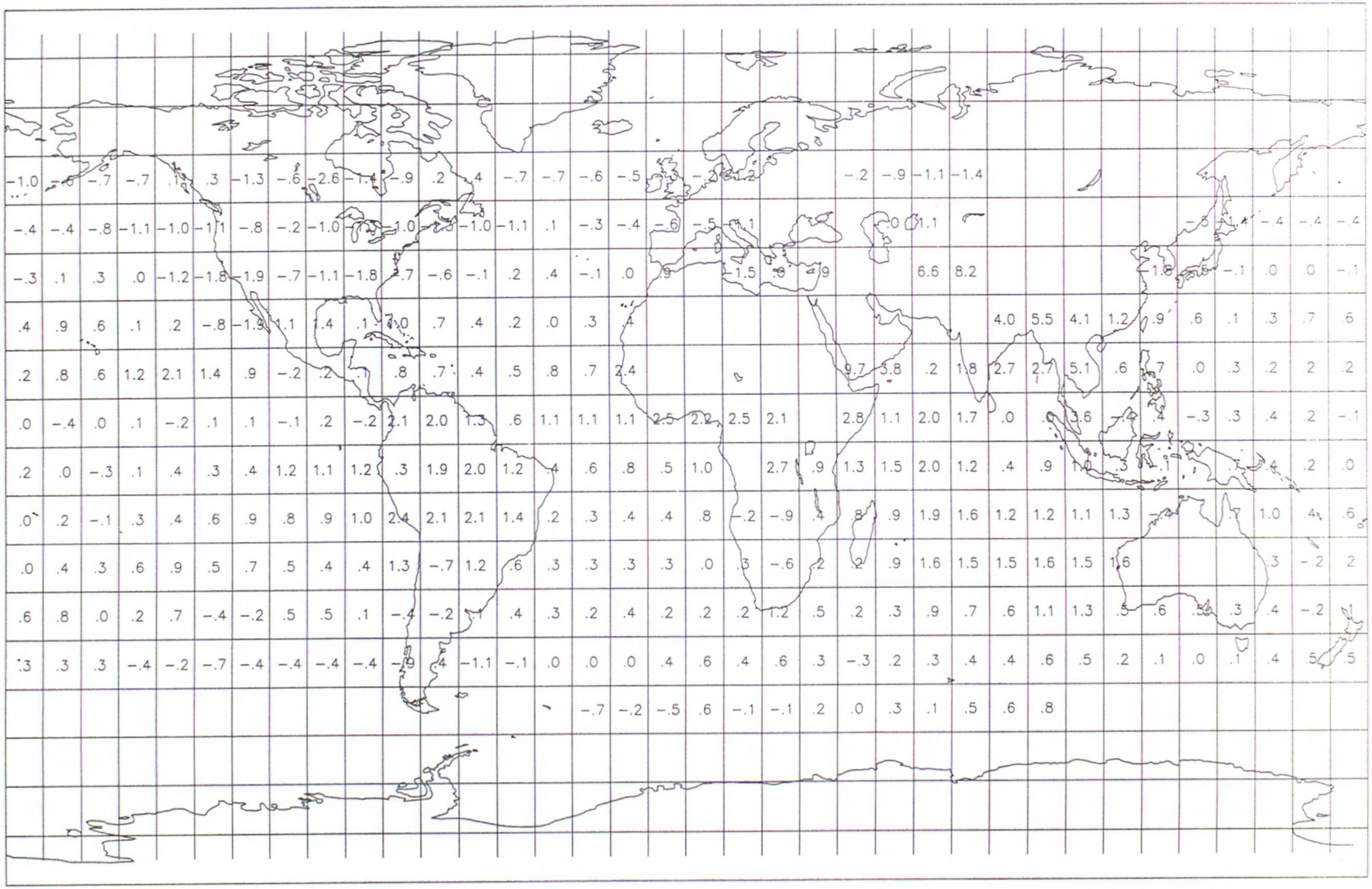


SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 13

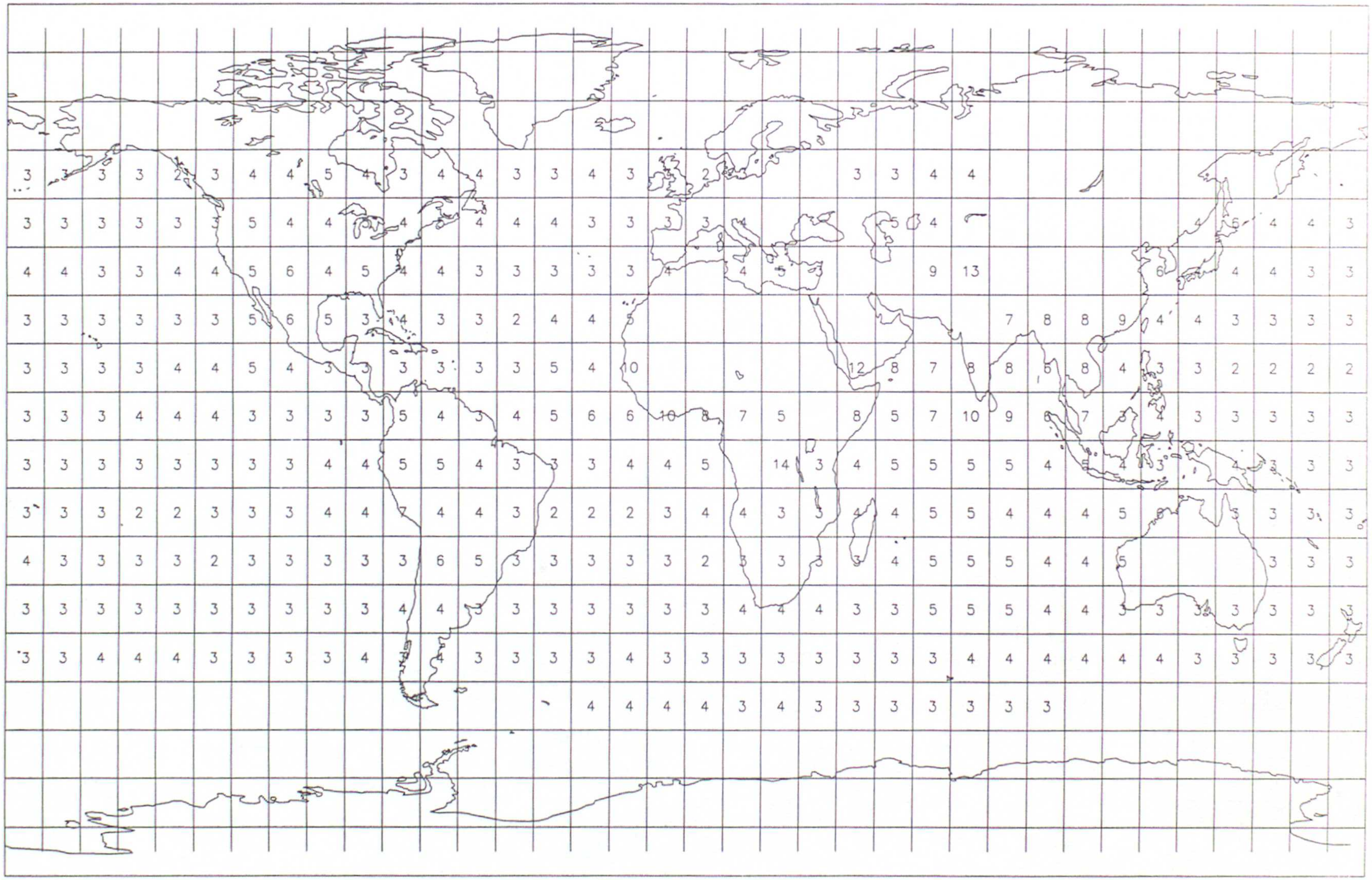
APRIL 1999

USING ALL OBSERVATIONS

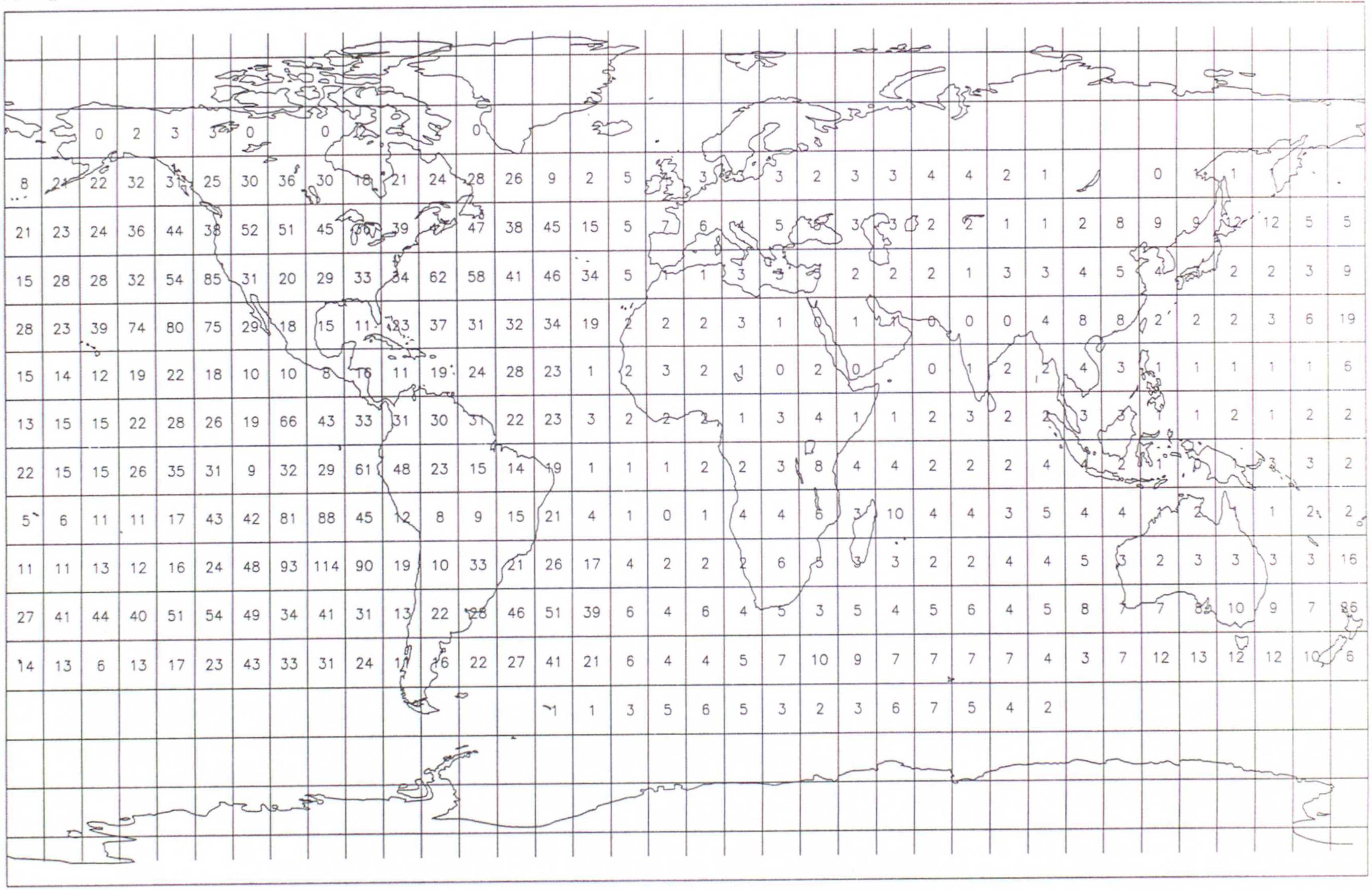
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


-1.0 -.6 -.7 -.7 .1 .3 -1.3 -.6 -2.6 -1.4 -.9 .2 .4 -.7 -.7 -.6 -.5 -.3 -.2 -1.2 -.2 -.9 -1.1 -1.4
-.4 -.4 -.8 -1.1 -1.0 -1.1 -.8 -.2 -1.0 -1.3 -1.0 -1.3 -1.0 -1.1 .1 -.3 -.4 -.6 -.5 -1.1 .0 1.1 -.5 -1.4 -.4 -.4 -.4
-.3 .1 .3 .0 -1.2 -1.8 -1.9 -.7 -1.1 -1.8 -.7 -.6 -.1 .2 .4 -.1 .0 .9 -1.5 .8 .9 6.6 8.2 -1.8 -.5 -.1 .0 .0 -.1
.4 .9 .6 .1 .2 -.8 -1.9 1.1 1.4 .1 1.0 .7 .4 .2 .0 .3 .4 4.0 5.5 4.1 1.2 .9 .6 .1 .3 .7 .6
.2 .8 .6 1.2 2.1 1.4 .9 -.2 .2 .1 .8 .7 .4 .5 .8 .7 2.4 9.7 3.8 .2 1.8 2.7 2.7 5.1 .6 .7 .0 .3 .2 .2 .2
.0 -.4 .0 .1 -.2 .1 .1 -.1 .2 -.2 2.1 2.0 1.3 .6 1.1 1.1 1.1 2.5 2.2 2.5 2.1 2.8 1.1 2.0 1.7 .0 .0 3.6 -.4 .4 -.3 .3 .4 .2 -.1
.2 .0 -.3 .1 .4 .3 .4 1.2 1.1 1.2 .3 1.9 2.0 1.2 .4 .6 .8 .5 1.0 2.7 .9 1.3 1.5 2.0 1.2 .4 .9 1.0 .3 .1 .4 .2 .0
.0 .2 -.1 .3 .4 .6 .9 .8 .9 1.0 2.4 2.1 2.1 1.4 .2 .3 .4 .4 .8 -.2 -.9 .4 .8 .9 1.9 1.6 1.2 1.2 1.1 1.3 -.4 .7 1.0 .4 .6
.0 .4 .3 .6 .9 .5 .7 .5 .4 .4 1.3 -.7 1.2 .6 .3 .3 .3 .3 .0 .3 -.6 .2 .2 .9 1.6 1.5 1.5 1.6 1.5 1.6 .3 -.2 .2
.6 .8 .0 .2 .7 -.4 -.2 .5 .5 .1 -.4 -.2 .1 .4 .3 .2 .4 .2 .2 .2 1.2 .5 .2 .3 .9 .7 .6 1.1 1.3 .5 .6 .5 .3 .4 -.2 .1
.3 .3 .3 -.4 -.2 -.7 -.4 -.4 -.4 -.4 -.9 .4 -1.1 -.1 .0 .0 .0 .4 .6 .4 .6 .3 -.3 .2 .3 .4 .4 .6 .5 .2 .1 .0 .1 .4 .5 .5
-.7 -.2 -.5 .6 -.1 -.1 .2 .0 .3 .1 .5 .6 .8

SATOBS : RMS O–B VECTOR DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 14
APRIL 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT

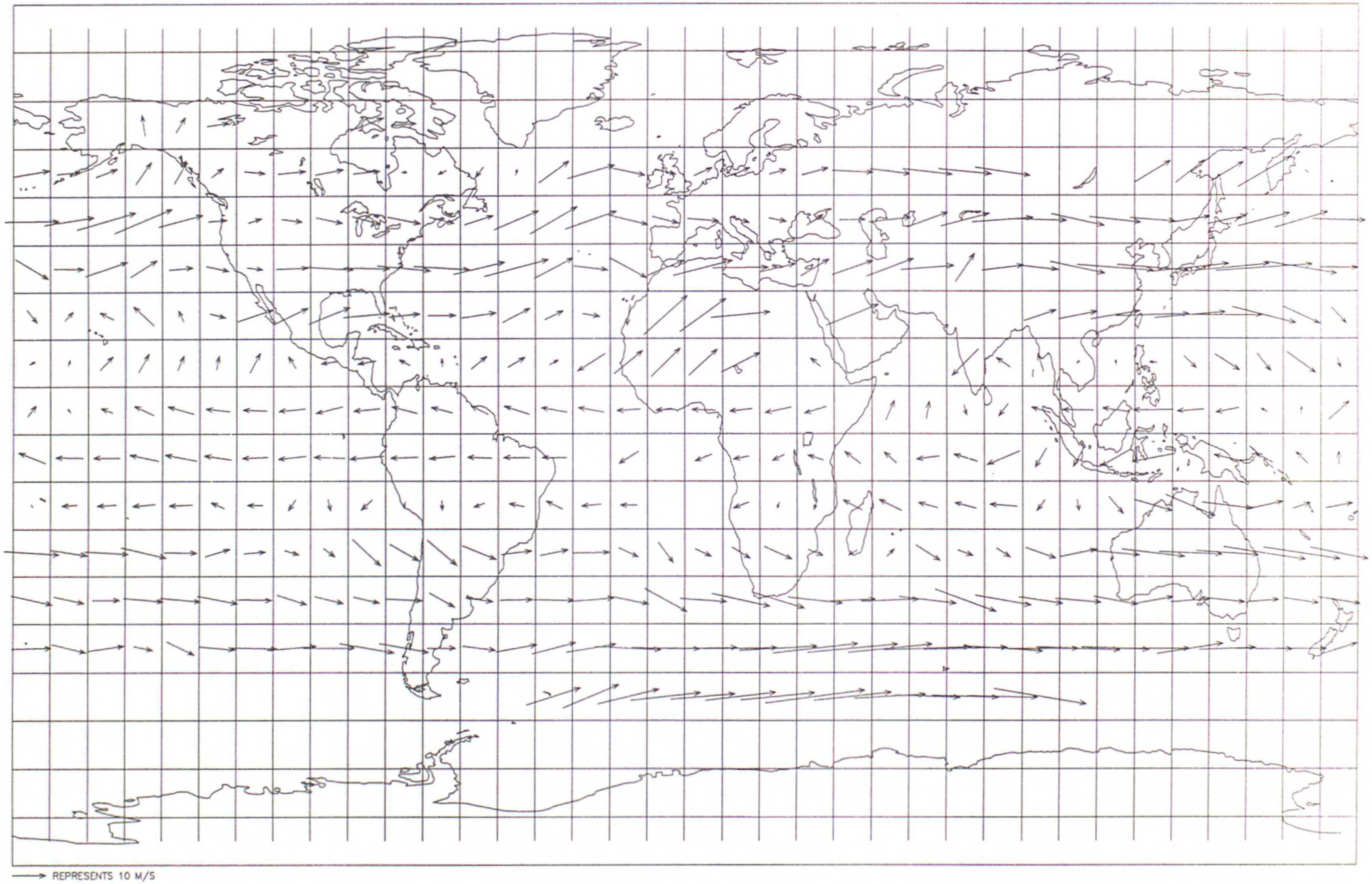

3 3 3 3 2 3 4 4 5 4 3 4 4 3 3 4 3 3 2 3 3 4 4
3 3 3 3 3 3 5 4 4 4 4 4 4 3 3 3 3 4 5 4 4 5 4 4 3
4 4 3 3 4 4 5 6 4 5 4 4 3 3 3 3 3 4 4 5 3 9 13 6 4 4 4 3 3
3 3 3 3 3 3 5 6 5 3 4 3 3 2 4 4 5 7 8 8 9 4 4 3 3 3 3
3 3 3 3 4 4 5 4 3 3 3 3 3 3 5 4 10 12 8 7 8 8 5 8 4 3 3 2 2 2 2
3 3 3 4 4 4 3 3 3 3 5 4 3 4 5 6 6 10 8 7 5 8 5 7 10 9 6 7 3 4 3 3 3 3 3
3 3 3 3 3 3 3 3 4 4 5 5 4 3 3 3 4 4 5 14 3 4 5 5 5 5 4 5 4 3 4 3 3 3
3 3 3 2 2 3 3 3 4 4 7 4 4 3 2 2 2 3 4 4 3 3 4 4 5 5 4 4 4 5 3 3 3 3
4 3 3 3 3 2 3 3 3 3 3 6 5 3 3 3 3 3 2 3 3 3 3 4 5 5 5 4 4 5 3 3 3
3 3 3 3 3 3 3 3 3 3 4 4 3 3 3 3 3 3 3 4 4 4 3 3 5 5 5 4 4 3 3 3 3 3 3 3
3 3 4 4 4 3 3 3 3 4 3 4 3 3 3 3 4 3 3 3 3 3 3 3 3 3 4 4 4 4 4 4 3 3 3 3 3
4 4 4 4 3 4 3 3 3 3 3 3 3

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 15
APRIL 1999


0 2 3 3 0 0 0
8 21 22 32 31 25 30 36 30 18 21 24 28 26 9 2 5 3 3 2 3 3 4 4 2 1 0 1 1
21 23 24 36 44 38 52 51 45 36 39 47 47 38 45 15 5 7 6 4 5 5 3 3 2 2 1 1 2 8 9 9 12 12 5 5
15 28 28 32 54 85 31 20 29 33 34 62 58 41 46 34 5 1 1 3 3 5 2 2 2 1 3 3 4 5 4 2 2 3 9
28 23 39 74 80 75 29 18 15 11 23 37 31 32 34 19 2 2 2 3 1 0 1 1 0 0 0 4 8 8 2 2 2 3 6 19
15 14 12 19 22 18 10 10 8 16 11 19 24 28 23 1 2 3 2 1 0 2 0 0 1 2 2 4 3 1 1 1 1 1 6
13 15 15 22 28 26 19 66 43 33 31 30 31 22 23 3 2 2 2 1 3 4 1 1 2 3 2 2 3 3 1 1 2 1 2 2
22 15 15 26 35 31 9 32 29 61 48 23 15 14 19 1 1 1 2 2 3 8 4 4 2 2 2 4 4 2 1 3 3 2
5 6 11 11 17 43 42 81 88 45 12 8 9 15 21 4 1 0 1 4 4 6 3 10 4 4 3 5 4 4 2 1 2 2
11 11 13 12 16 24 48 93 114 90 19 10 33 21 26 17 4 2 2 2 6 5 3 3 2 2 4 4 5 3 2 3 3 3 3 16
27 41 44 40 51 54 49 34 41 31 13 22 28 46 51 39 6 4 6 4 5 3 5 4 5 6 4 5 8 7 7 88 10 9 7 86
14 13 6 13 17 23 43 33 31 24 11 16 22 27 41 21 6 4 4 5 7 10 9 7 7 7 7 4 3 7 12 13 12 12 10 6
1 1 3 5 6 5 3 2 3 6 7 5 4 2

SATOB VECTOR MEAN WINDS BETWEEN 401–700 HPA
APRIL 1999
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

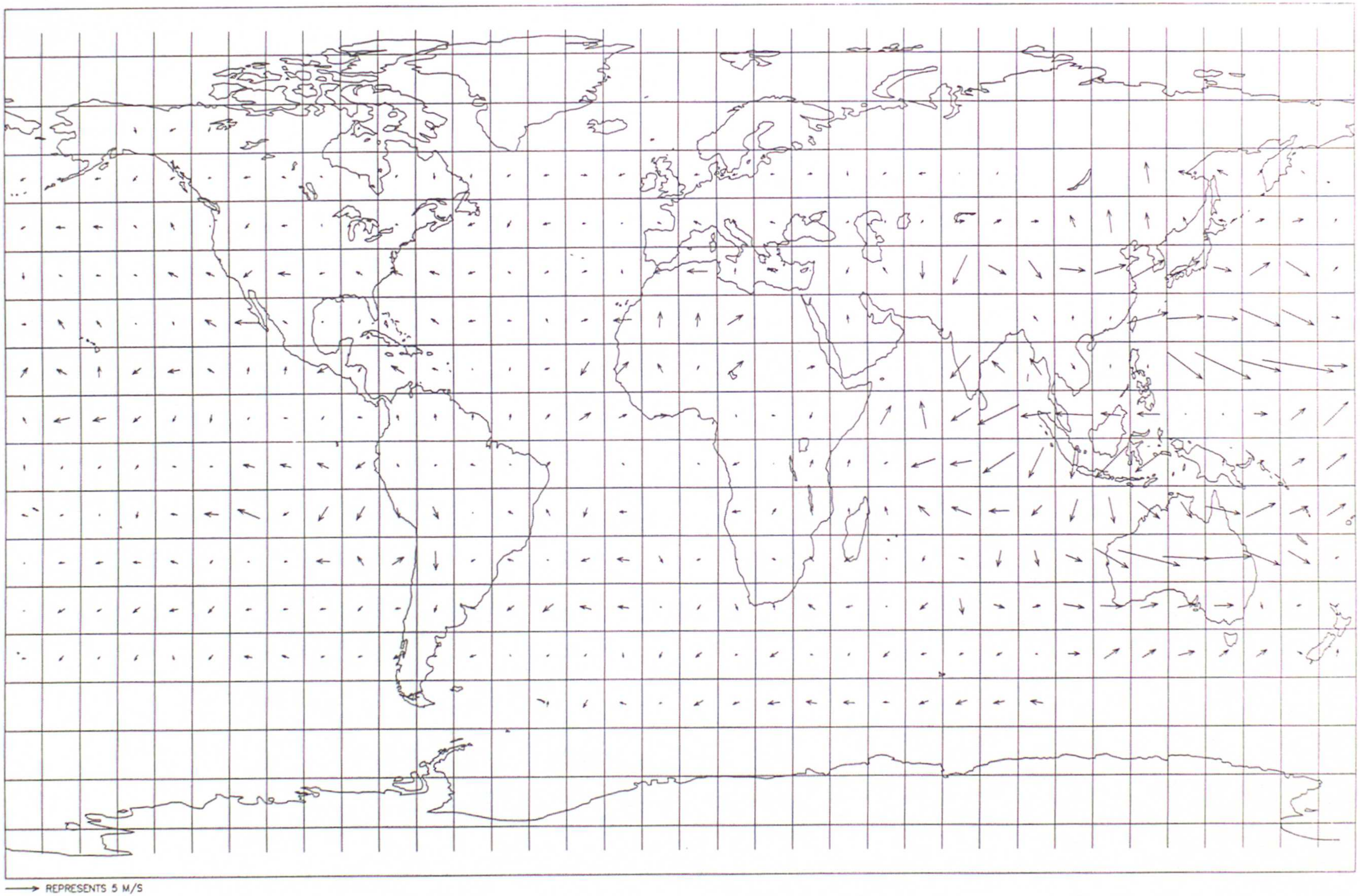
FIGURE 16


REPRESENTS 10 M/S

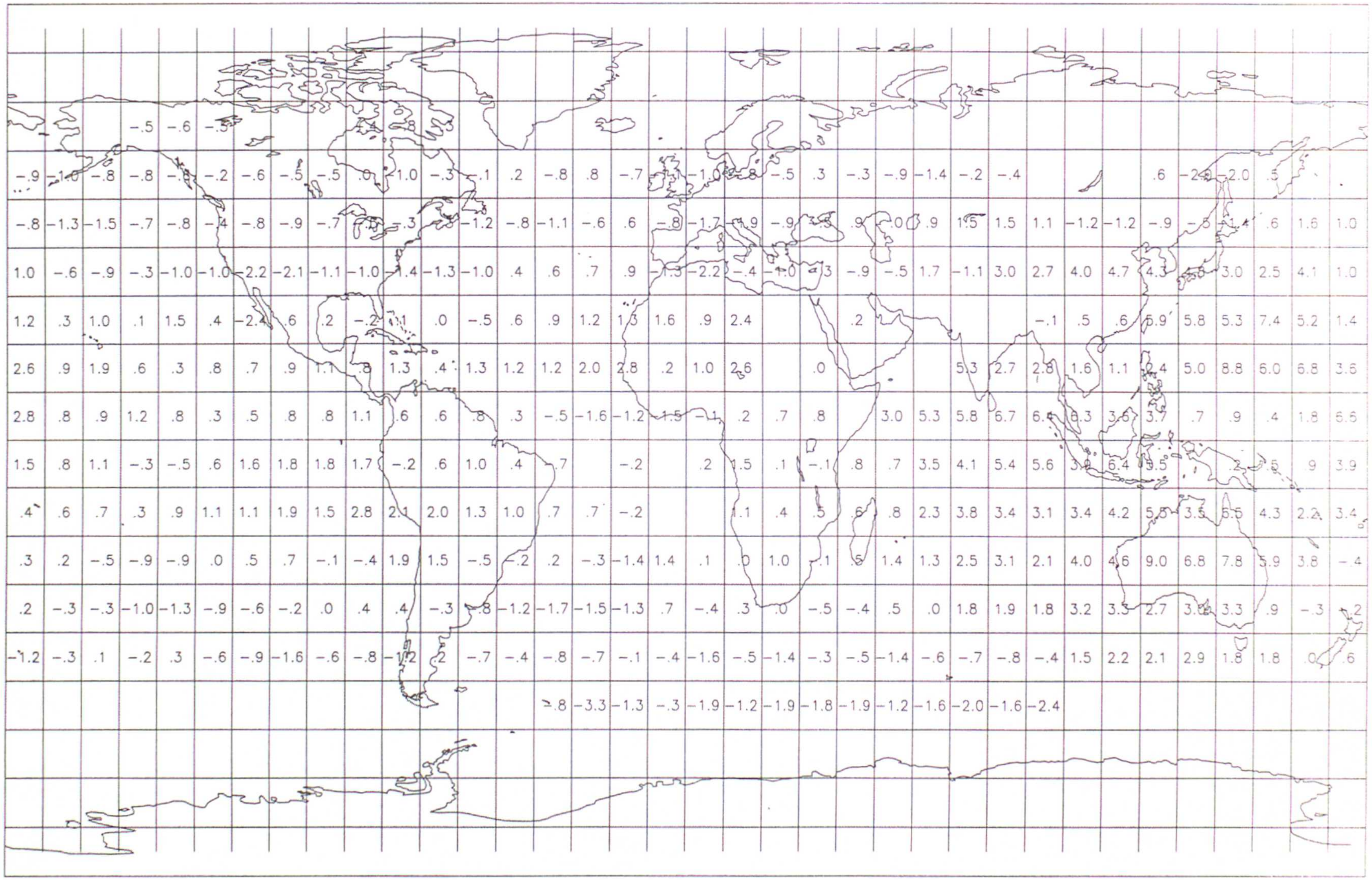
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 401-700 HPA

FIGURE 17

APRIL 1999
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 5 M/S

SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 18
APRIL 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT



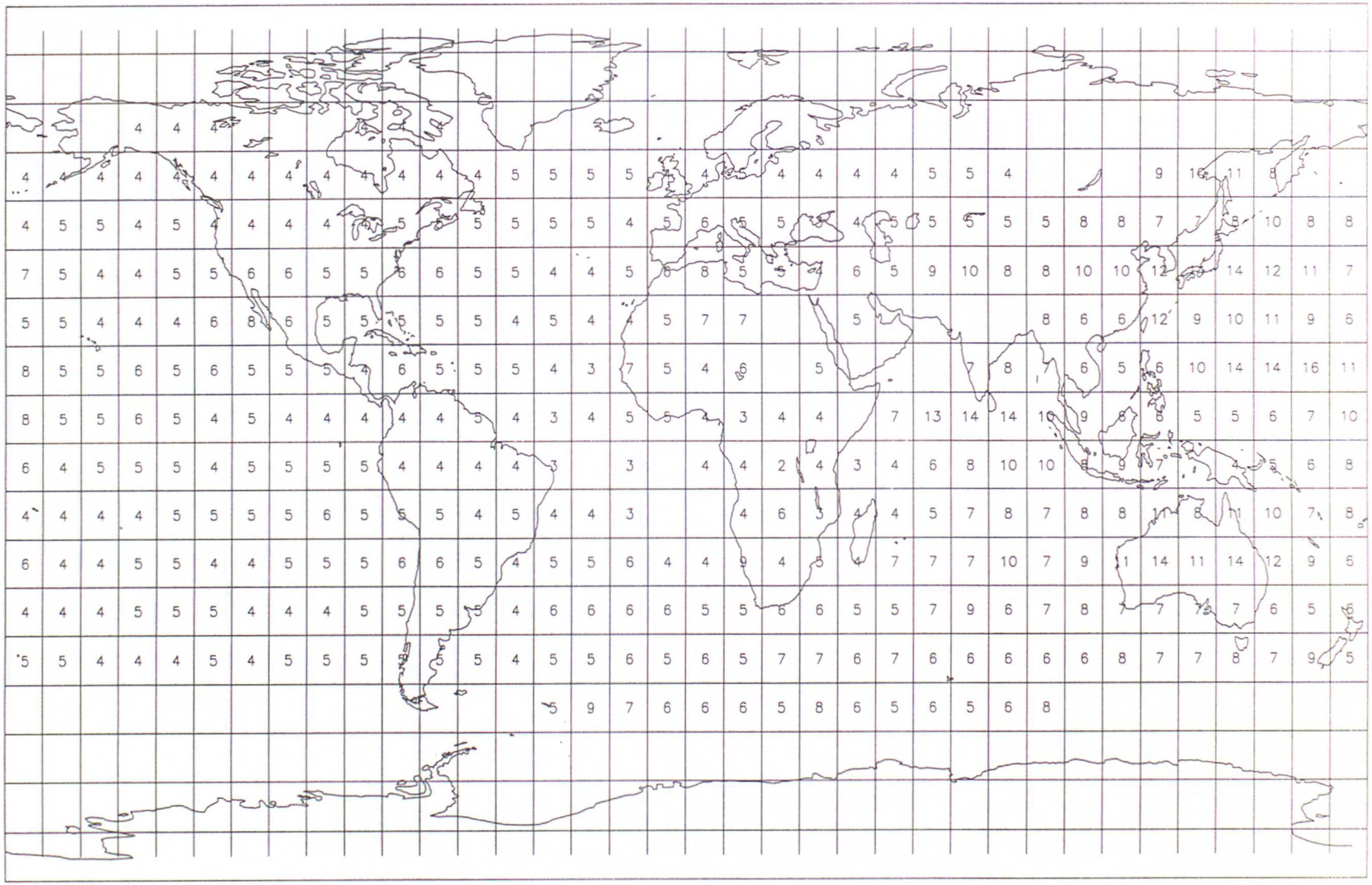
-.5 -.6 -.5 -.8
-.9 -1.0 -.8 -.8 -.8 -.2 -.6 -.5 -.5 .0 -1.0 -.3 -.1 .2 -.8 .8 -.7 -1.1 -1.0 -.8 -.5 .3 -.3 -.9 -1.4 -.2 -.4 .6 -2.0 -2.0 .5
-.8 -1.3 -1.5 -.7 -.8 -.4 -.8 -.9 -.7 -.5 -.3 -.3 -1.2 -.8 -1.1 -.6 .6 -.8 -1.7 -1.9 -.9 -.3 .9 -.0 .9 1.5 1.5 1.1 -1.2 -1.2 -.9 -.5 -1.4 .6 1.6 1.0
1.0 -.6 -.9 -.3 -1.0 -1.0 -2.2 -2.1 -1.1 -1.0 -1.4 -1.3 -1.0 .4 .6 .7 .9 -1.3 -2.2 -.4 -1.0 -.3 -.9 -.5 1.7 -1.1 3.0 2.7 4.0 4.7 4.3 4.5 3.0 2.5 4.1 1.0
1.2 .3 1.0 .1 1.5 .4 -2.4 .6 .2 -.2 -.1 .0 -.5 .6 .9 1.2 1.3 1.6 .9 2.4 .2 -.1 .5 .6 5.9 5.8 5.3 7.4 5.2 1.4
2.6 .9 1.9 .6 .3 .8 .7 .9 1.1 .8 1.3 .4 1.3 1.2 1.2 2.0 2.8 .2 1.0 2.6 .0 5.3 2.7 2.8 1.6 1.1 2.4 5.0 8.8 6.0 6.8 3.6
2.8 .8 .9 1.2 .8 .3 .5 .8 .8 1.1 .6 .6 .8 .3 -.5 -1.6 -1.2 -1.5 -1.1 .2 .7 .8 3.0 5.3 5.8 6.7 6.4 6.3 3.6 3.7 .7 .9 .4 1.8 6.6
1.5 .8 1.1 -.3 -.5 .6 1.6 1.8 1.8 1.7 -.2 .6 1.0 .4 -.7 -.2 .2 1.5 .1 -.1 .8 .7 3.5 4.1 5.4 5.6 3.9 6.4 5.5 .2 .5 .9 3.9
.4 .6 .7 .3 .9 1.1 1.1 1.9 1.5 2.8 2.1 2.0 1.3 1.0 .7 .7 -.2 1.1 .4 .5 .6 .8 2.3 3.8 3.4 3.1 3.4 4.2 5.5 3.5 6.5 4.3 2.2 3.4
.3 .2 -.5 -.9 -.9 .0 .5 .7 -.1 -.4 1.9 1.5 -.5 -.2 .2 -.3 -1.4 1.4 .1 .0 1.0 -.1 .5 1.4 1.3 2.5 3.1 2.1 4.0 4.6 9.0 6.8 7.8 5.9 3.8 -.4
.2 -.3 -.3 -1.0 -1.3 -.9 -.6 -.2 .0 .4 .4 -.3 -.8 -1.2 -1.7 -1.5 -1.3 .7 -.4 .3 .0 -.5 -.4 .5 .0 1.8 1.9 1.8 3.2 3.3 2.7 3.0 3.3 .9 -.3 .2
-1.2 -.3 .1 -.2 .3 -.6 -.9 -1.6 -.6 -.8 -1.2 .2 -.7 -.4 -.8 -.7 -.1 -.4 -1.6 -.5 -1.4 -.3 -.5 -1.4 -.6 -.7 -.8 -.4 1.5 2.2 2.1 2.9 1.8 1.8 .0 .6
-.8 -3.3 -1.3 -.3 -1.9 -1.2 -1.9 -1.8 -1.9 -1.2 -1.6 -2.0 -1.6 -2.4

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 19

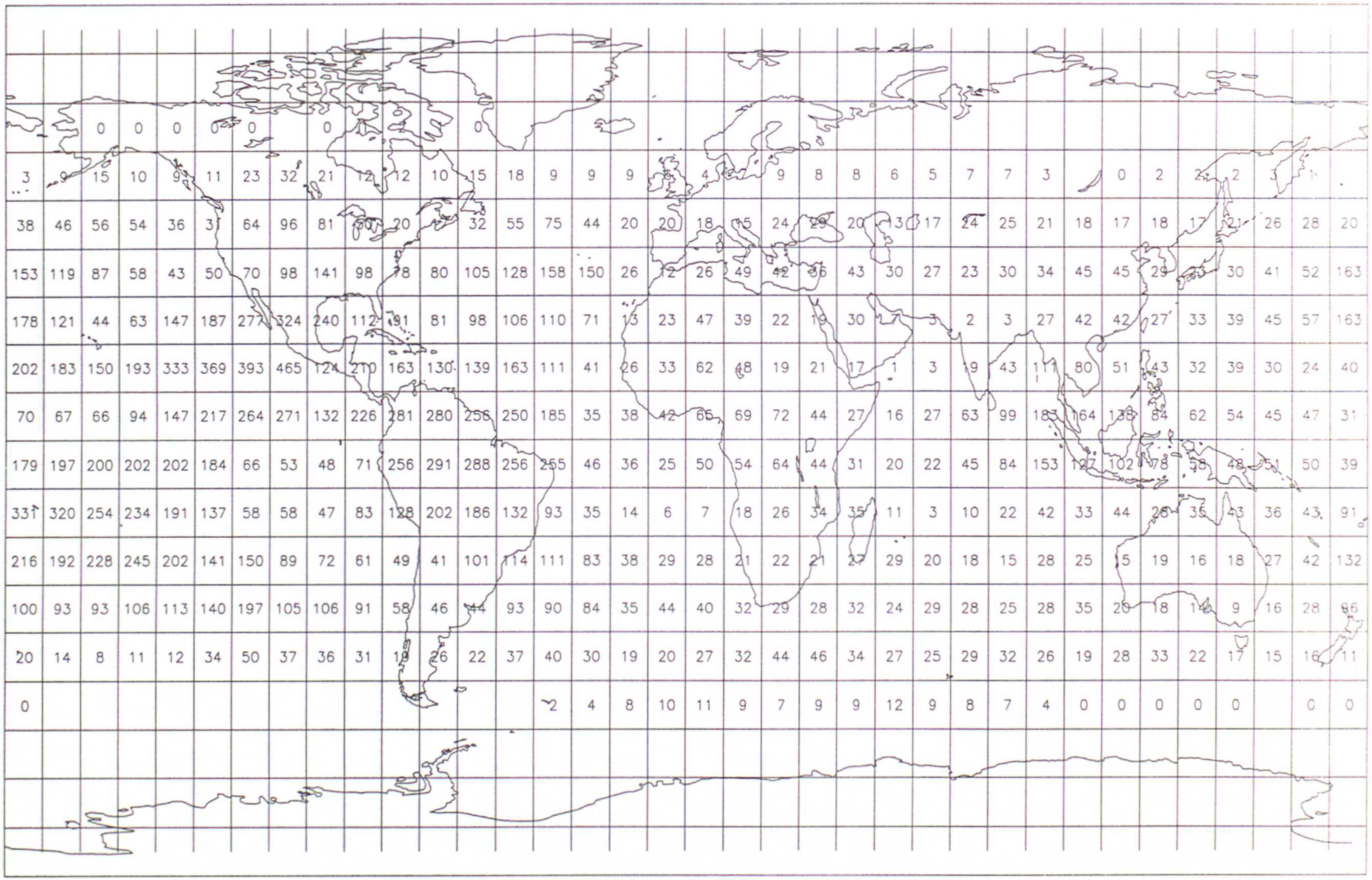
APRIL 1999

USING ALL OBSERVATIONS

VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


4 4 4 4 4 4
4 4 4 4 4 4 4 4 4 4 4 4 4 5 5 5 5 4 5 4 4 4 4 5 5 4 9 16 11 8
4 5 5 4 5 4 4 4 4 4 5 5 5 5 5 5 4 5 6 5 5 5 4 5 5 5 5 5 8 8 7 7 8 10 8 8
7 5 4 4 5 5 6 6 5 5 6 6 5 5 4 4 5 6 8 5 5 4 6 5 9 10 8 8 10 10 12 14 12 11 7
5 5 4 4 4 6 8 6 5 5 5 5 5 4 5 4 4 5 7 7 5 8 6 6 12 9 10 11 9 6
8 5 5 6 5 6 5 5 5 4 6 5 5 5 4 3 7 5 4 6 5 7 8 7 6 5 6 10 14 14 16 11
8 5 5 6 5 4 5 4 4 4 4 4 5 4 3 4 5 5 4 3 4 4 7 13 14 14 10 9 8 6 5 5 6 7 10
6 4 5 5 5 4 5 5 5 5 4 4 4 4 3 3 4 4 2 4 3 4 6 8 10 10 8 9 7 4 5 6 8
4 4 4 4 5 5 5 5 6 5 5 5 4 5 4 4 3 4 6 3 4 4 5 7 8 7 8 8 11 8 11 10 7 8
6 4 4 5 5 4 4 5 5 5 6 6 5 4 5 5 6 4 4 9 4 5 4 7 7 7 10 7 9 11 14 11 14 12 9 6
4 4 4 5 5 5 4 4 4 5 5 5 5 4 6 6 6 6 5 5 6 6 5 5 7 9 6 7 8 7 7 7 7 6 5 6
5 5 4 4 4 5 4 5 5 5 5 5 5 4 5 5 6 5 6 5 7 7 6 7 6 6 6 6 6 8 7 7 8 7 9 5
5 9 7 6 6 6 5 8 6 5 6 5 6 8

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 20
APRIL 1999



		0	0	0	0	0		0				0																							
3	9	15	10	9	11	23	32	21	12	12	10	15	18	9	9	9	6	4	[illegible]	9	8	8	6	5	7	7	3		0	2	2	2	3	1	
38	46	56	54	36	31	64	96	81	50	20	[illegible]	32	55	75	44	20	20	18	15	24	29	20	13	17	24	25	21	18	17	18	17	21	26	28	20
153	119	87	58	43	50	70	98	141	98	78	80	105	128	158	150	26	12	26	49	42	36	43	30	27	23	30	34	45	45	29	33	30	41	52	163
178	121	44	63	147	187	277	324	240	112	91	81	98	106	110	71	13	23	47	39	22	19	30	7	3	2	3	27	42	42	27	33	39	45	57	163
202	183	150	193	333	369	393	465	124	210	163	130	139	163	111	41	26	33	62	48	19	21	17	1	3	19	43	111	80	51	43	32	39	30	24	40
70	67	66	94	147	217	264	271	132	226	281	280	256	250	185	35	38	42	65	69	72	44	27	16	27	63	99	183	164	138	84	62	54	45	47	31
179	197	200	202	202	184	66	53	48	71	256	291	288	256	255	46	36	25	50	54	64	44	31	20	22	45	84	153	127	102	78	58	48	51	50	39
331	320	254	234	191	137	58	58	47	83	128	202	186	132	93	35	14	6	7	18	26	34	35	11	3	10	22	42	33	44	26	35	43	36	43	91
216	192	228	245	202	141	150	89	72	61	49	41	101	114	111	83	38	29	28	21	22	21	27	29	20	18	15	28	25	15	19	16	18	27	42	132
100	93	93	106	113	140	197	105	106	91	58	46	44	93	90	84	35	44	40	32	29	28	32	24	29	28	25	28	35	20	18	14	9	16	28	86
20	14	8	11	12	34	50	37	36	31	19	26	22	37	40	30	19	20	27	32	44	46	34	27	25	29	32	26	19	28	33	22	17	15	16	11
0														2	4	8	10	11	9	7	9	9	12	9	8	7	4	0	0	0	0	0		0	0

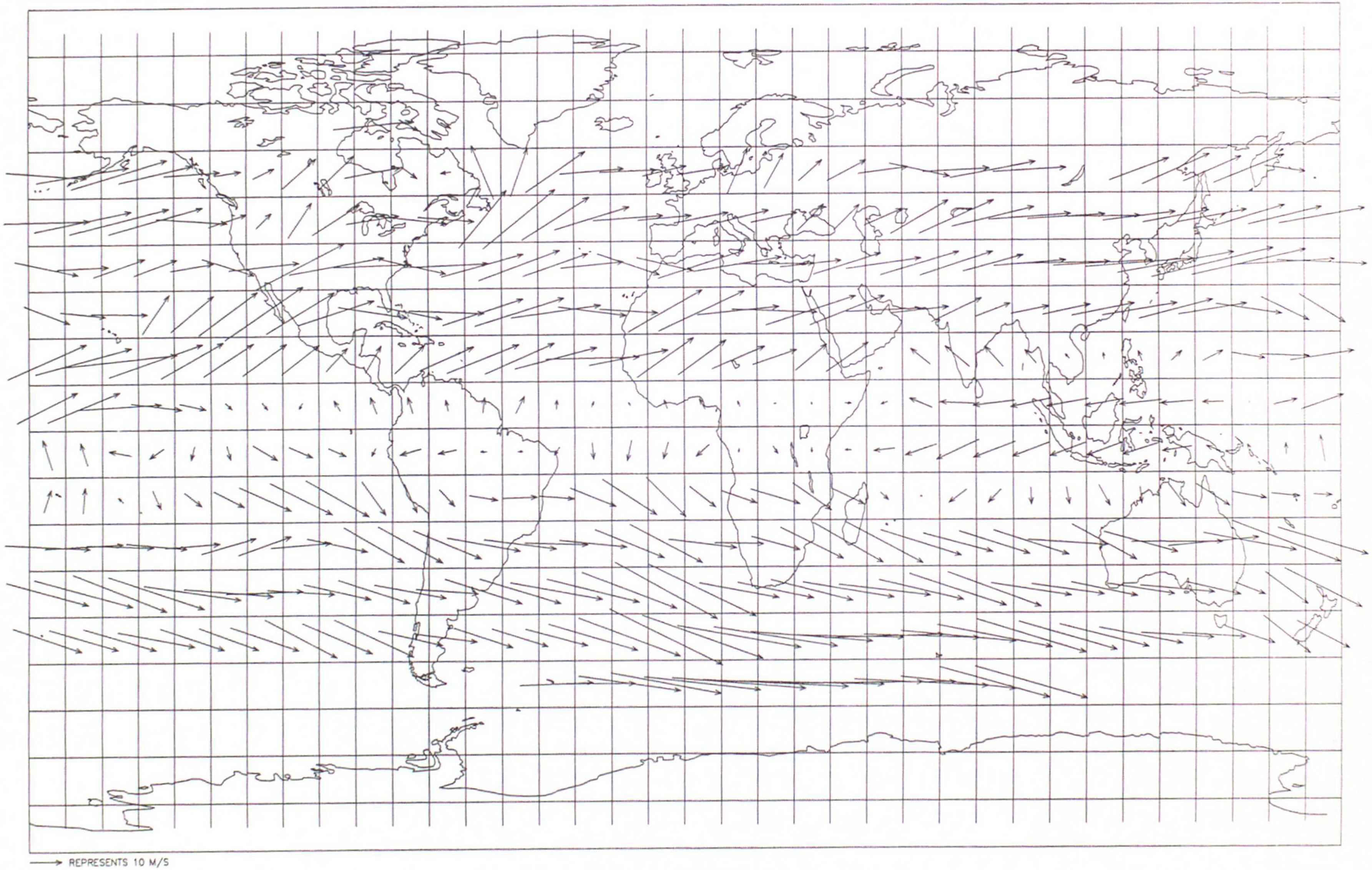
SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 101–400 HPA

FIGURE 21

APRIL 1999

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


→ REPRESENTS 10 M/S

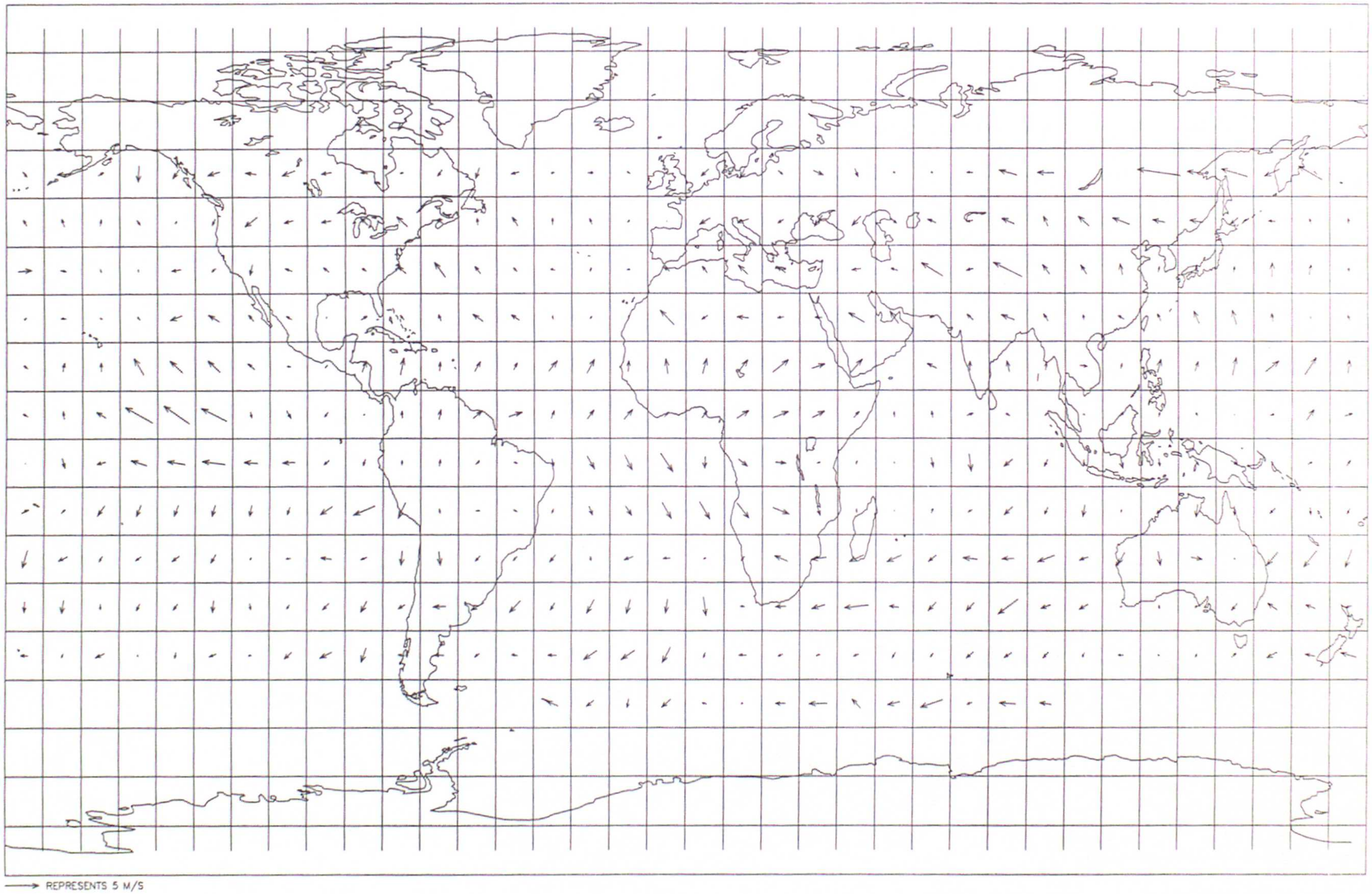
SATOB O–B VECTOR WIND DIFFERENCES BETWEEN 101–400 HPA

FIGURE 22

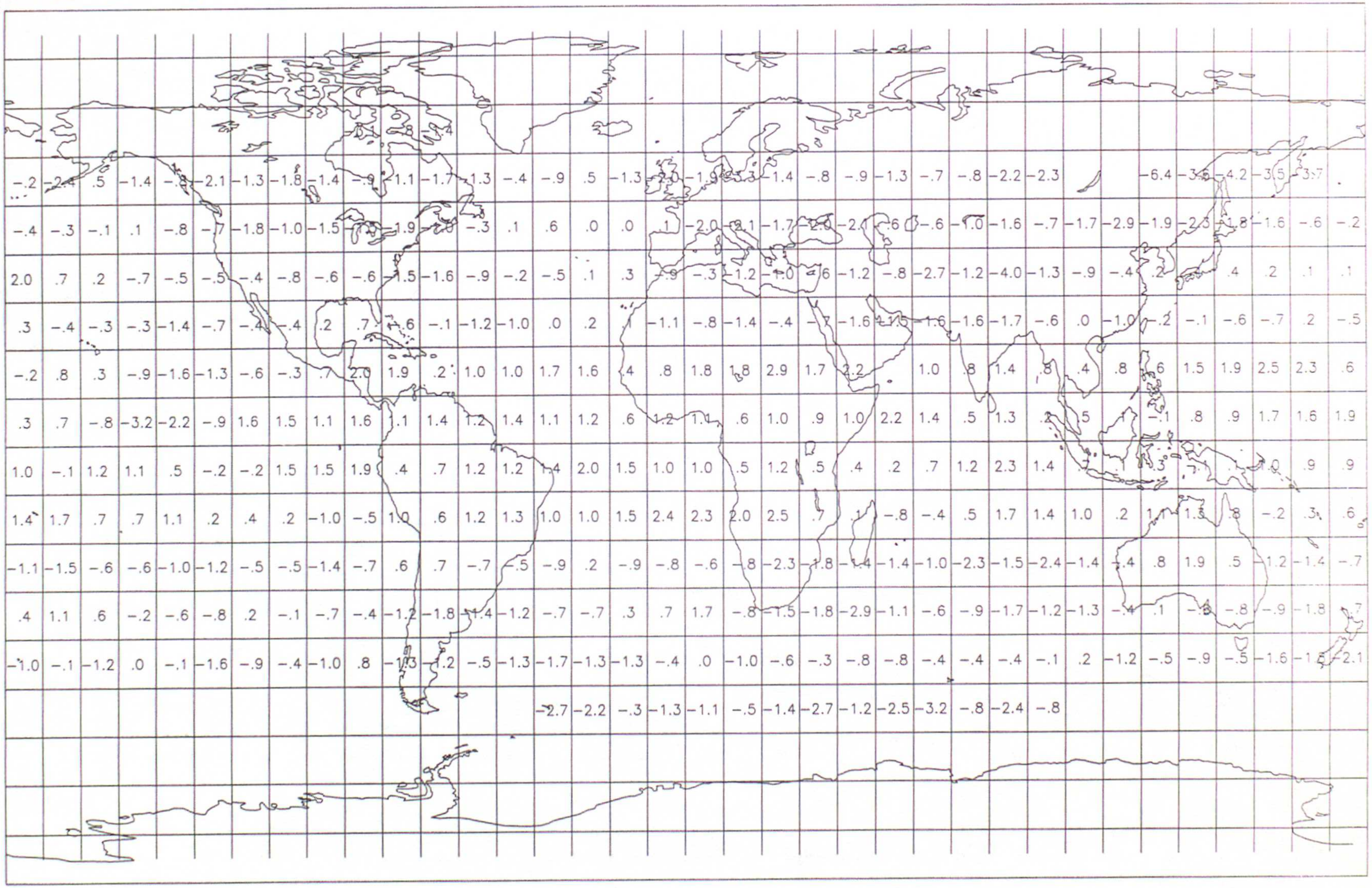
APRIL 1999

ALL OBSERVATIONS

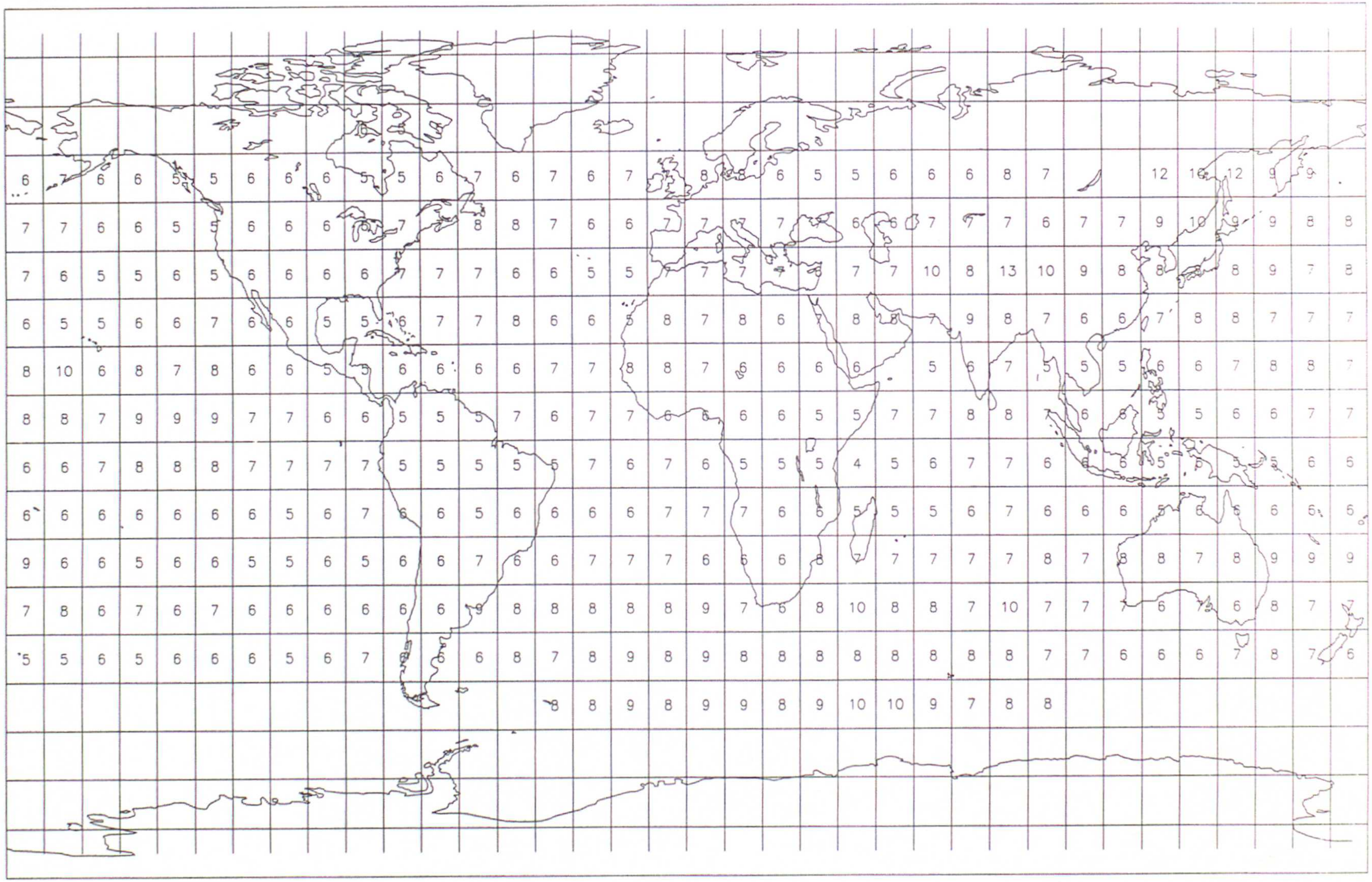
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 23
APRIL 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


-.1 -.8 -1.4
-.2 -2.4 .5 -1.4 -.8 -2.1 -1.3 -1.8 -1.4 -.9 -1.1 -1.7 -1.3 -.4 -.9 .5 -1.3 -2.0 -1.9 -3.3 -1.4 -.8 -.9 -1.3 -.7 -.8 -2.2 -2.3 -6.4 -3.6 -4.2 -3.5 -3.7
-.4 -.3 -.1 .1 -.8 -.7 -1.8 -1.0 -1.5 -1.5 -1.9 -2.0 -.3 .1 .6 .0 .0 .1 -2.0 -2.1 -1.7 -2.0 -2.1 -.6 -.6 -1.0 -1.6 -.7 -1.7 -2.9 -1.9 -2.3 -1.8 -1.6 -.6 -.2
2.0 .7 .2 -.7 -.5 -.5 -.4 -.8 -.6 -.6 -1.5 -1.6 -.9 -.2 -.5 .1 .3 -.9 -.3 -1.2 -1.0 -.6 -1.2 -.8 -2.7 -1.2 -4.0 -1.3 -.9 -.4 .2 .4 .2 .1 .1
.3 -.4 -.3 -.3 -1.4 -.7 -.4 -.4 .2 .7 -.6 -.1 -1.2 -1.0 .0 .2 .1 -1.1 -.8 -1.4 -.4 -.7 -1.6 -1.5 -1.6 -1.6 -1.7 -.6 .0 -1.0 -.2 -.1 -.6 -.7 .2 -.5
-.2 .8 .3 -.9 -1.6 -1.3 -.6 -.3 .7 2.0 1.9 .2 1.0 1.0 1.7 1.6 .4 .8 1.8 1.8 2.9 1.7 2.2 1.0 .8 1.4 .8 .4 .8 .6 1.5 1.9 2.5 2.3 .6
.3 .7 -.8 -3.2 -2.2 -.9 1.6 1.5 1.1 1.6 1.1 1.4 1.2 1.4 1.1 1.2 .6 1.2 1.1 .6 1.0 .9 1.0 2.2 1.4 .5 1.3 .2 .5 .1 -.1 .8 .9 1.7 1.6 1.9
1.0 -.1 1.2 1.1 .5 -.2 -.2 1.5 1.5 1.9 .4 .7 1.2 1.2 1.4 2.0 1.5 1.0 1.0 .5 1.2 .5 .4 .2 .7 1.2 2.3 1.4 .7 .1 .3 -.1 .1 1.0 .9 .9
1.4 1.7 .7 .7 1.1 .2 .4 .2 -1.0 -.5 1.0 .6 1.2 1.3 1.0 1.0 1.5 2.4 2.3 2.0 2.5 .7 .1 -.8 -.4 .5 1.7 1.4 1.0 .2 1.1 1.3 .8 -.2 .3 .6
-1.1 -1.5 -.6 -.6 -1.0 -1.2 -.5 -.5 -1.4 -.7 .6 .7 -.7 -.5 -.9 .2 -.9 -.8 -.6 -.8 -2.3 -1.8 -1.4 -1.4 -1.0 -2.3 -1.5 -2.4 -1.4 -.4 .8 1.9 .5 -1.2 -1.4 -.7
.4 1.1 .6 -.2 -.6 -.8 .2 -.1 -.7 -.4 -1.2 -1.8 -1.4 -1.2 -.7 -.7 .3 .7 1.7 -.8 -1.5 -1.8 -2.9 -1.1 -.6 -.9 -1.7 -1.2 -1.3 -.4 .1 -.3 -.8 -.9 -1.8 .7
-1.0 -.1 -1.2 .0 -.1 -1.6 -.9 -.4 -1.0 .8 -1.3 -1.2 -.5 -1.3 -1.7 -1.3 -1.3 -.4 .0 -1.0 -.6 -.3 -.8 -.8 -.4 -.4 -.4 -.1 .2 -1.2 -.5 -.9 -.5 -1.6 -1.5 -2.1
-2.7 -2.2 -.3 -1.3 -1.1 -.5 -1.4 -2.7 -1.2 -2.5 -3.2 -.8 -2.4 -.8

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 24
APRIL 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


6 7 6 6 5 5 6 6 6 5 5 6 7 6 7 6 7 8 8 6 5 5 6 6 6 8 7 12 16 12 9 9
7 7 6 6 5 5 6 6 6 7 8 8 7 6 6 7 7 7 7 7 6 6 7 7 7 6 7 7 9 10 9 9 8 8
7 6 5 5 6 5 6 6 6 6 7 7 7 6 6 5 5 7 7 7 7 8 7 7 10 8 13 10 9 8 8 8 8 9 7 8
6 5 5 6 6 7 6 6 5 5 6 7 7 8 6 6 5 8 7 8 6 7 8 8 7 9 8 7 6 6 7 8 8 7 7 7
8 10 6 8 7 8 6 6 5 5 6 6 6 6 7 7 8 8 7 6 6 6 6 5 6 7 5 5 5 6 6 7 8 8 7
8 8 7 9 9 9 7 7 6 6 5 5 5 7 6 7 7 6 6 6 6 5 5 7 7 8 8 7 6 6 5 5 6 6 7 7
6 6 7 8 8 8 7 7 7 7 5 5 5 5 5 7 6 7 6 5 5 5 4 5 6 7 7 6 6 6 5 6 5 5 6 6
6 6 6 6 6 6 6 5 6 7 6 6 5 6 6 6 6 7 7 7 6 6 5 5 5 6 7 6 6 6 5 6 6 6 6 6
9 6 6 5 6 6 5 5 6 5 6 6 7 6 6 7 7 7 6 6 6 8 7 7 7 7 7 8 7 8 8 7 8 9 9 9
7 8 6 7 6 7 6 6 6 6 6 6 9 8 8 8 8 8 9 7 6 8 10 8 8 7 10 7 7 7 6 7 6 8 7 7
5 5 6 5 6 6 6 5 6 7 6 6 6 8 7 8 9 8 9 8 8 8 8 8 8 8 8 7 7 6 6 6 7 8 7 6
8 8 9 8 9 9 8 9 10 10 9 7 8 8

MONITORING OF SATELLITE RADIANCES

MONITORING CENTRE: BRACKNELL

MONTH: April 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-15.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :All soundings.

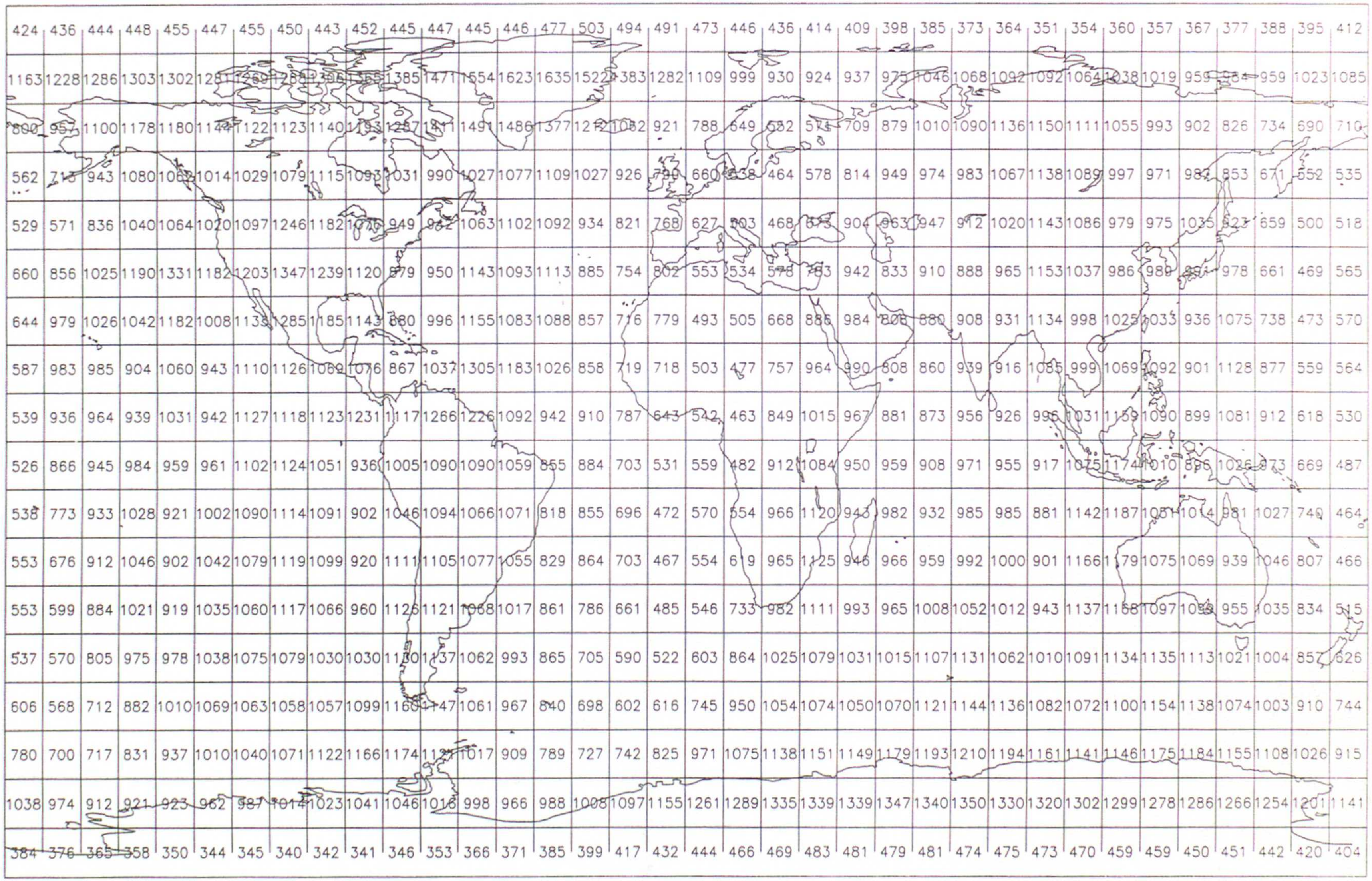
Data Extracted :Sounding channels (and approximate weighting function peaks, hPa)

- HIRS8 (Surface)
- HIRS15 (700)
- HIRS11 (500-700)
- HIRS4 (400)
- AMSUA5 (700)
- AMSUA7 (300)
- AMSUA9 (100)

:Mean and standard deviation observation-minus-background brightness temperature differences

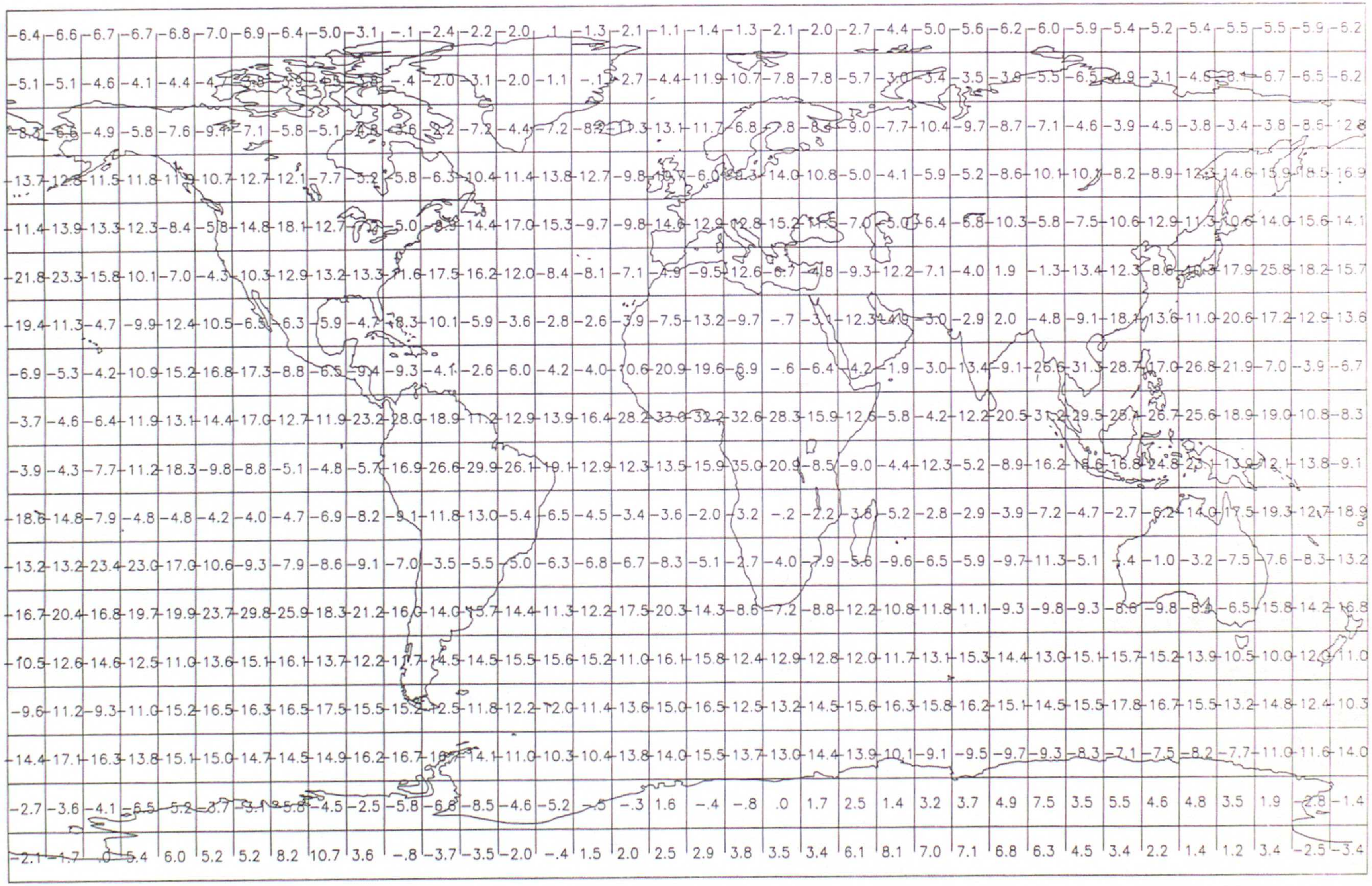
ATOVS: MEAN DAILY NUMBER OF OBSERVATIONS
21/4/1999 to 30/4/1999
NOAA-15, USING ALL OBSERVATIONS

FIGURE 25



424	436	444	448	455	447	455	450	443	452	445	447	445	446	477	503	494	491	473	446	436	414	409	398	385	373	364	351	354	360	357	367	377	388	395	412
1163	1228	1286	1303	1302	1281	1269	1288	1396	1565	1385	1471	1554	1623	1635	1522	1383	1282	1109	999	930	924	937	975	1046	1068	1092	1092	1064	1038	1019	959	984	959	1023	1085
800	957	1100	1178	1180	1144	1122	1123	1140	1193	1287	1411	1491	1486	1377	1212	1062	921	788	649	632	571	709	879	1010	1090	1136	1150	1111	1055	993	902	826	734	690	710
562	713	943	1080	1062	1014	1029	1079	1115	1093	1031	990	1027	1077	1109	1027	926	790	660	538	464	578	814	949	974	983	1067	1138	1089	997	971	982	853	671	552	535
529	571	836	1040	1064	1020	1097	1246	1182	1076	949	962	1063	1102	1092	934	821	768	627	503	468	573	904	963	947	912	1020	1143	1086	979	975	1035	923	659	500	518
660	856	1025	1190	1331	1182	1203	1347	1239	1120	879	950	1143	1093	1113	885	754	802	553	534	578	763	942	833	910	888	965	1153	1037	986	989	891	978	661	469	565
644	979	1026	1042	1182	1008	1133	1285	1185	1143	880	996	1155	1083	1088	857	716	779	493	505	668	886	984	808	880	908	931	1134	998	1025	1033	936	1075	738	473	570
587	983	985	904	1060	943	1110	1126	1069	1076	867	1037	1305	1183	1026	858	719	718	503	477	757	964	990	808	860	939	916	1085	999	1069	1092	901	1128	877	559	564
539	936	964	939	1031	942	1127	1118	1123	1231	1117	1266	1226	1092	942	910	787	643	542	463	849	1015	967	881	873	956	926	995	1031	1159	1090	899	1081	912	618	530
526	866	945	984	959	961	1102	1124	1051	936	1005	1090	1090	1059	855	884	703	531	559	482	912	1084	950	959	908	971	955	917	1075	1174	1010	896	1026	973	669	487
538	773	933	1028	921	1002	1090	1114	1091	902	1046	1094	1066	1071	818	855	696	472	570	554	966	1120	943	982	932	985	985	881	1142	1187	1051	1014	981	1027	740	464
553	676	912	1046	902	1042	1079	1119	1099	920	1111	1105	1077	1055	829	864	703	467	554	619	965	1125	946	966	959	992	1000	901	1166	1179	1075	1069	939	1046	807	466
553	599	884	1021	919	1035	1060	1117	1066	960	1126	1121	1068	1017	861	786	661	485	546	733	982	1111	993	965	1008	1052	1012	943	1137	1168	1097	1059	955	1035	834	515
537	570	805	975	978	1038	1075	1079	1030	1030	1130	1137	1062	993	865	705	590	522	603	864	1025	1079	1031	1015	1107	1131	1062	1010	1091	1134	1135	1113	1021	1004	857	626
606	568	712	882	1010	1069	1063	1058	1057	1099	1160	1147	1061	967	840	698	602	616	745	950	1054	1074	1050	1070	1121	1144	1136	1082	1072	1100	1154	1138	1074	1003	910	744
780	700	717	831	937	1010	1040	1071	1122	1166	1174	1127	1017	909	789	727	742	825	971	1075	1138	1151	1149	1179	1193	1210	1194	1161	1141	1146	1175	1184	1155	1108	1026	915
1038	974	912	921	923	962	987	1014	1023	1041	1046	1016	998	966	988	1008	1097	1155	1261	1289	1335	1339	1339	1347	1340	1350	1330	1320	1302	1299	1278	1286	1266	1254	1201	1141
384	376	365	358	350	344	345	340	342	341	346	353	366	371	385	399	417	432	444	466	469	483	481	479	481	474	475	473	470	459	459	450	451	442	420	404

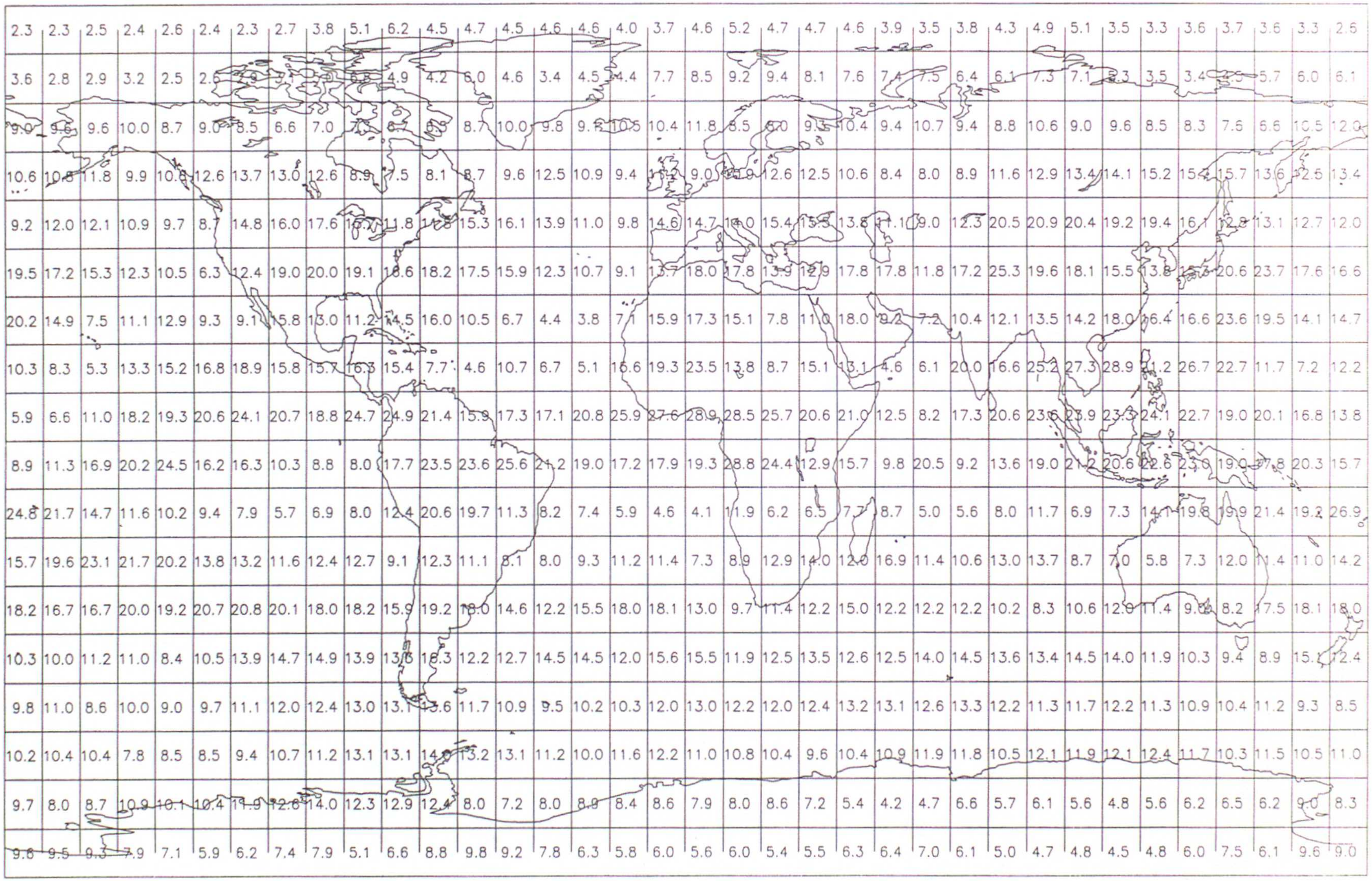
ATOVS : MEAN O−B TEMPERATURE DIFFERENCES (DEG C) : HIRS8 channel (Surface)
21/4/1999 to 30/4/1999 FIGURE 26
NOAA−15, USING ALL OBSERVATIONS



-6.4	-6.6	-6.7	-6.7	-6.8	-7.0	-6.9	-6.4	-5.0	-3.1	-.1	-2.4	-2.2	-2.0	.1	-1.3	-2.1	-1.1	-1.4	-1.3	-2.1	-2.0	-2.7	-4.4	-5.0	-5.6	-6.2	-6.0	-5.9	-5.4	-5.2	-5.4	-5.5	-5.5	-5.9	-6.2
-5.1	-5.1	-4.6	-4.1	-4.4	-4.7	-3.8	-3.9	-4.5	-3.8	-.4	-2.0	-3.1	-2.0	-1.1	-.1	-2.7	-4.4	-11.9	-10.7	-7.8	-7.8	-5.7	-3.0	-3.4	-3.5	-3.8	-5.5	-6.5	-4.9	-3.1	-4.5	-8.1	-6.7	-6.5	-6.2
-8.3	-6.6	-4.9	-5.8	-7.6	-9.1	-7.1	-5.8	-5.1	-4.8	-3.6	-2.2	-7.2	-4.4	-7.2	-8.2	-11.3	-13.1	-11.7	-6.8	-7.8	-8.4	-9.0	-7.7	-10.4	-9.7	-8.7	-7.1	-4.6	-3.9	-4.5	-3.8	-3.4	-3.8	-8.5	-12.8
-13.7	-12.8	-11.5	-11.8	-11.9	-10.7	-12.7	-12.1	-7.7	-5.2	-5.8	-6.3	-10.4	-11.4	-13.8	-12.7	-9.8	-10.7	-6.0	-9.3	-14.0	-10.8	-5.0	-4.1	-5.9	-5.2	-8.6	-10.1	-10.1	-8.2	-8.9	-12.3	-14.6	-15.9	-18.5	-16.9
-11.4	-13.9	-13.3	-12.3	-8.4	-5.8	-14.8	-18.1	-12.7	-7.4	-5.0	-8.9	-14.4	-17.0	-15.3	-9.7	-9.8	-14.6	-12.9	-12.8	-15.2	-11.5	-7.0	-5.0	-6.4	-6.8	-10.3	-5.8	-7.5	-10.6	-12.9	-11.3	-10.6	-14.0	-15.6	-14.1
-21.8	-23.3	-15.8	-10.1	-7.0	-4.3	-10.3	-12.9	-13.2	-13.3	-11.6	-17.5	-16.2	-12.0	-8.4	-8.1	-7.1	-4.9	-9.5	-12.6	-6.7	-4.8	-9.3	-12.2	-7.1	-4.0	1.9	-1.3	-13.4	-12.3	-8.6	-10.3	-17.9	-25.8	-18.2	-15.7
-19.4	-11.3	-4.7	-9.9	-12.4	-10.5	-6.5	-6.3	-5.9	-4.7	-8.3	-10.1	-5.9	-3.6	-2.8	-2.6	-3.9	-7.5	-13.2	-9.7	-.7	-3.1	-12.3	-4.9	-3.0	-2.9	2.0	-4.8	-9.1	-18.1	-13.6	-11.0	-20.6	-17.2	-12.9	-13.6
-6.9	-5.3	-4.2	-10.9	-15.2	-16.8	-17.3	-8.8	-6.5	-9.4	-9.3	-4.1	-2.6	-6.0	-4.2	-4.0	-10.6	-20.9	-19.6	-6.9	-.6	-6.4	-4.2	-1.9	-3.0	-13.4	-9.1	-26.6	-31.3	-28.7	-17.0	-26.8	-21.9	-7.0	-3.9	-6.7
-3.7	-4.6	-6.4	-11.9	-13.1	-14.4	-17.0	-12.7	-11.9	-23.2	-28.0	-18.9	-11.2	-12.9	-13.9	-16.4	-28.2	-33.0	-32.2	-32.6	-28.3	-15.9	-12.6	-5.8	-4.2	-12.2	-20.5	-31.2	-29.5	-25.4	-26.7	-25.6	-18.9	-19.0	-10.8	-8.3
-3.9	-4.3	-7.7	-11.2	-18.3	-9.8	-8.8	-5.1	-4.8	-5.7	-16.9	-26.6	-29.9	-26.1	-19.1	-12.9	-12.3	-13.5	-15.9	-35.0	-20.9	-8.5	-9.0	-4.4	-12.3	-5.2	-8.9	-16.2	-18.6	-16.8	-24.8	-23.1	-13.9	-12.1	-13.8	-9.1
-18.6	-14.8	-7.9	-4.8	-4.8	-4.2	-4.0	-4.7	-6.9	-8.2	-9.1	-11.8	-13.0	-5.4	-6.5	-4.5	-3.4	-3.6	-2.0	-3.2	-.2	-2.2	-3.8	-5.2	-2.8	-2.9	-3.9	-7.2	-4.7	-2.7	-6.2	-14.0	-17.5	-19.3	-12.7	-18.9
-13.2	-13.2	-23.4	-23.0	-17.0	-10.6	-9.3	-7.9	-8.6	-9.1	-7.0	-3.5	-5.5	-5.0	-6.3	-6.8	-6.7	-8.3	-5.1	-2.7	-4.0	-7.9	-5.6	-9.6	-6.5	-5.9	-9.7	-11.3	-5.1	-.4	-1.0	-3.2	-7.5	-7.6	-8.3	-13.2
-16.7	-20.4	-16.8	-19.7	-19.9	-23.7	-29.8	-25.9	-18.3	-21.2	-16.0	-14.0	-15.7	-14.4	-11.3	-12.2	-17.5	-20.3	-14.3	-8.6	-7.2	-8.8	-12.2	-10.8	-11.8	-11.1	-9.3	-9.8	-9.3	-8.6	-9.8	-8.4	-6.5	-15.8	-14.2	-16.8
-10.5	-12.6	-14.6	-12.5	-11.0	-13.6	-15.1	-16.1	-13.7	-12.2	-11.7	-14.5	-14.5	-15.5	-15.6	-15.2	-11.0	-16.1	-15.8	-12.4	-12.9	-12.8	-12.0	-11.7	-13.1	-15.3	-14.4	-13.0	-15.1	-15.7	-15.2	-13.9	-10.5	-10.0	-12.0	-11.0
-9.6	-11.2	-9.3	-11.0	-15.2	-16.5	-16.3	-16.5	-17.5	-15.5	-15.2	-12.5	-11.8	-12.2	-12.0	-11.4	-13.6	-15.0	-16.5	-12.5	-13.2	-14.5	-15.6	-16.3	-15.8	-16.2	-15.1	-14.5	-15.5	-17.8	-16.7	-15.5	-13.2	-14.8	-12.4	-10.3
-14.4	-17.1	-16.3	-13.8	-15.1	-15.0	-14.7	-14.5	-14.9	-16.2	-16.7	-16.[illegible]	-14.1	-11.0	-10.3	-10.4	-13.8	-14.0	-15.5	-13.7	-13.0	-14.4	-13.9	-10.1	-9.1	-9.5	-9.7	-9.3	-8.3	-7.1	-7.5	-8.2	-7.7	-11.0	-11.6	-14.0
-2.7	-3.6	-4.1	-6.5	-5.2	-3.7	-3.1	-5.8	-4.5	-2.5	-5.8	-6.8	-8.5	-4.6	-5.2	-.5	-.3	1.6	-.4	-.8	.0	1.7	2.5	1.4	3.2	3.7	4.9	7.5	3.5	5.5	4.6	4.8	3.5	1.9	-2.8	-1.4
-2.1	-1.7	.0	5.4	6.0	5.2	5.2	8.2	10.7	3.6	-.8	-3.7	-3.5	-2.0	-.4	1.5	2.0	2.5	2.9	3.8	3.5	3.4	6.1	8.1	7.0	7.1	6.8	6.3	4.5	3.4	2.2	1.4	1.2	3.4	-2.5	-3.4

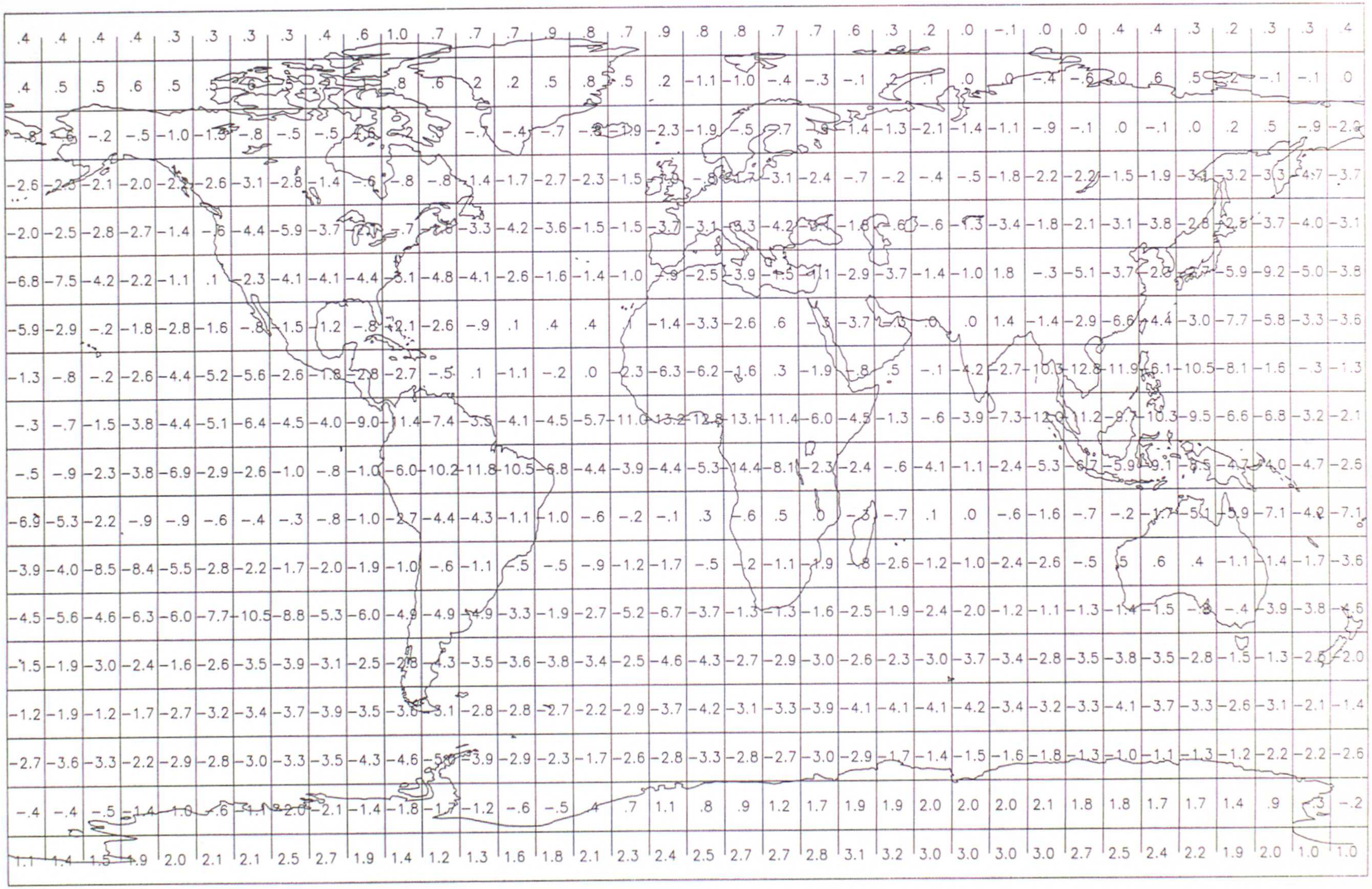
ATOVS : SD O-B TEMPERATURE DIFFERENCES (DEG C) : HIRS8 channel (Surface)
21/4/1999 to 30/4/1999
NOAA-15, USING ALL OBSERVATIONS

FIGURE 27


2.3 2.3 2.5 2.4 2.6 2.4 2.3 2.7 3.8 5.1 6.2 4.5 4.7 4.5 4.6 4.6 4.0 3.7 4.6 5.2 4.7 4.7 4.6 3.9 3.5 3.8 4.3 4.9 5.1 3.5 3.3 3.6 3.7 3.6 3.3 2.6
3.6 2.8 2.9 3.2 2.5 2.6 2.9 3.1 [illegible] 6.8 4.9 4.2 6.0 4.6 3.4 4.5 4.4 7.7 8.5 9.2 9.4 8.1 7.6 7.4 7.5 6.4 6.1 7.3 7.1 3.3 3.5 3.4 [illegible] 5.7 6.0 6.1
9.0 9.6 9.6 10.0 8.7 9.0 8.5 6.6 7.0 7.5 6.7 6.5 8.7 10.0 9.8 9.1 10.5 10.4 11.8 8.5 6.0 9.3 10.4 9.4 10.7 9.4 8.8 10.6 9.0 9.6 8.5 8.3 7.6 6.6 10.5 12.0
10.6 10.8 11.8 9.9 10.8 12.6 13.7 13.0 12.6 8.9 7.5 8.1 8.7 9.6 12.5 10.9 9.4 11.2 9.0 10.9 12.6 12.5 10.6 8.4 8.0 8.9 11.6 12.9 13.4 14.1 15.2 15.4 15.7 13.6 12.5 13.4
9.2 12.0 12.1 10.9 9.7 8.7 14.8 16.0 17.6 16.7 11.8 14.8 15.3 16.1 13.9 11.0 9.8 14.6 14.7 14.0 15.4 15.5 13.8 11.1 9.0 12.3 20.5 20.9 20.4 19.2 19.4 16.1 12.8 13.1 12.7 12.0
19.5 17.2 15.3 12.3 10.5 6.3 12.4 19.0 20.0 19.1 18.6 18.2 17.5 15.9 12.3 10.7 9.1 13.7 18.0 17.8 13.9 12.9 17.8 17.8 11.8 17.2 25.3 19.6 18.1 15.5 13.8 15.3 20.6 23.7 17.6 16.6
20.2 14.9 7.5 11.1 12.9 9.3 9.1 15.8 13.0 11.2 14.5 16.0 10.5 6.7 4.4 3.8 7.1 15.9 17.3 15.1 7.8 11.0 18.0 9.2 7.2 10.4 12.1 13.5 14.2 18.0 16.4 16.6 23.6 19.5 14.1 14.7
10.3 8.3 5.3 13.3 15.2 16.8 18.9 15.8 15.7 16.3 15.4 7.7 4.6 10.7 6.7 5.1 16.6 19.3 23.5 13.8 8.7 15.1 13.1 4.6 6.1 20.0 16.6 25.2 27.3 28.9 21.2 26.7 22.7 11.7 7.2 12.2
5.9 6.6 11.0 18.2 19.3 20.6 24.1 20.7 18.8 24.7 24.9 21.4 15.9 17.3 17.1 20.8 25.9 27.6 28.9 28.5 25.7 20.6 21.0 12.5 8.2 17.3 20.6 23.6 23.9 23.3 24.1 22.7 19.0 20.1 16.8 13.8
8.9 11.3 16.9 20.2 24.5 16.2 16.3 10.3 8.8 8.0 17.7 23.5 23.6 25.6 21.2 19.0 17.2 17.9 19.3 28.8 24.4 12.9 15.7 9.8 20.5 9.2 13.6 19.0 21.2 20.6 22.6 23.0 19.0 17.8 20.3 15.7
24.8 21.7 14.7 11.6 10.2 9.4 7.9 5.7 6.9 8.0 12.4 20.6 19.7 11.3 8.2 7.4 5.9 4.6 4.1 11.9 6.2 6.5 7.7 8.7 5.0 5.6 8.0 11.7 6.9 7.3 14.1 19.8 19.9 21.4 19.2 26.9
15.7 19.6 23.1 21.7 20.2 13.8 13.2 11.6 12.4 12.7 9.1 12.3 11.1 8.1 8.0 9.3 11.2 11.4 7.3 8.9 12.9 14.0 12.0 16.9 11.4 10.6 13.0 13.7 8.7 7.0 5.8 7.3 12.0 11.4 11.0 14.2
18.2 16.7 16.7 20.0 19.2 20.7 20.8 20.1 18.0 18.2 15.9 19.2 18.0 14.6 12.2 15.5 18.0 18.1 13.0 9.7 11.4 12.2 15.0 12.2 12.2 12.2 10.2 8.3 10.6 12.0 11.4 9.6 8.2 17.5 18.1 18.0
10.3 10.0 11.2 11.0 8.4 10.5 13.9 14.7 14.9 13.9 13.6 18.3 12.2 12.7 14.5 14.5 12.0 15.6 15.5 11.9 12.5 13.5 12.6 12.5 14.0 14.5 13.6 13.4 14.5 14.0 11.9 10.3 9.4 8.9 15.1 12.4
9.8 11.0 8.6 10.0 9.0 9.7 11.1 12.0 12.4 13.0 13.1 13.6 11.7 10.9 9.5 10.2 10.3 12.0 13.0 12.2 12.0 12.4 13.2 13.1 12.6 13.3 12.2 11.3 11.7 12.2 11.3 10.9 10.4 11.2 9.3 8.5
10.2 10.4 10.4 7.8 8.5 8.5 9.4 10.7 11.2 13.1 13.1 14.0 13.2 13.1 11.2 10.0 11.6 12.2 11.0 10.8 10.4 9.6 10.4 10.9 11.9 11.8 10.5 12.1 11.9 12.1 12.4 11.7 10.3 11.5 10.5 11.0
9.7 8.0 8.7 10.9 10.1 10.4 11.9 12.6 14.0 12.3 12.9 12.4 8.0 7.2 8.0 8.9 8.4 8.6 7.9 8.0 8.6 7.2 5.4 4.2 4.7 6.6 5.7 6.1 5.6 4.8 5.6 6.2 6.5 6.2 9.0 8.3
9.6 9.5 9.3 7.9 7.1 5.9 6.2 7.4 7.9 5.1 6.6 8.8 9.8 9.2 7.8 6.3 5.8 6.0 5.6 6.0 5.4 5.5 6.3 6.4 7.0 6.1 5.0 4.7 4.8 4.5 4.8 6.0 7.5 6.1 9.6 9.0

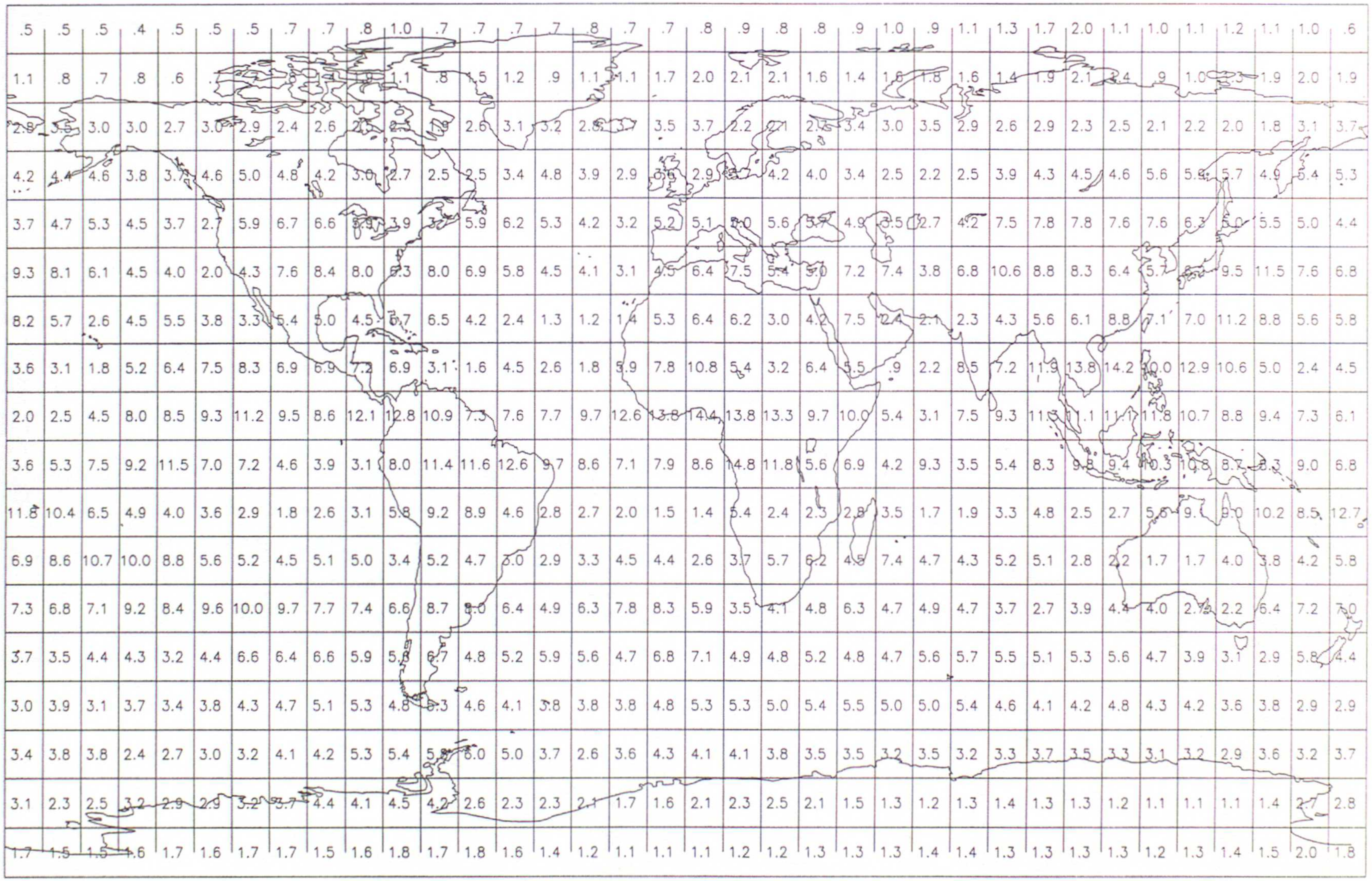
ATOVS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : HIRS15 Channel (700 hPa)
21/4/1999 to 30/4/1999
NOAA-15, USING ALL OBSERVATIONS

FIGURE 28



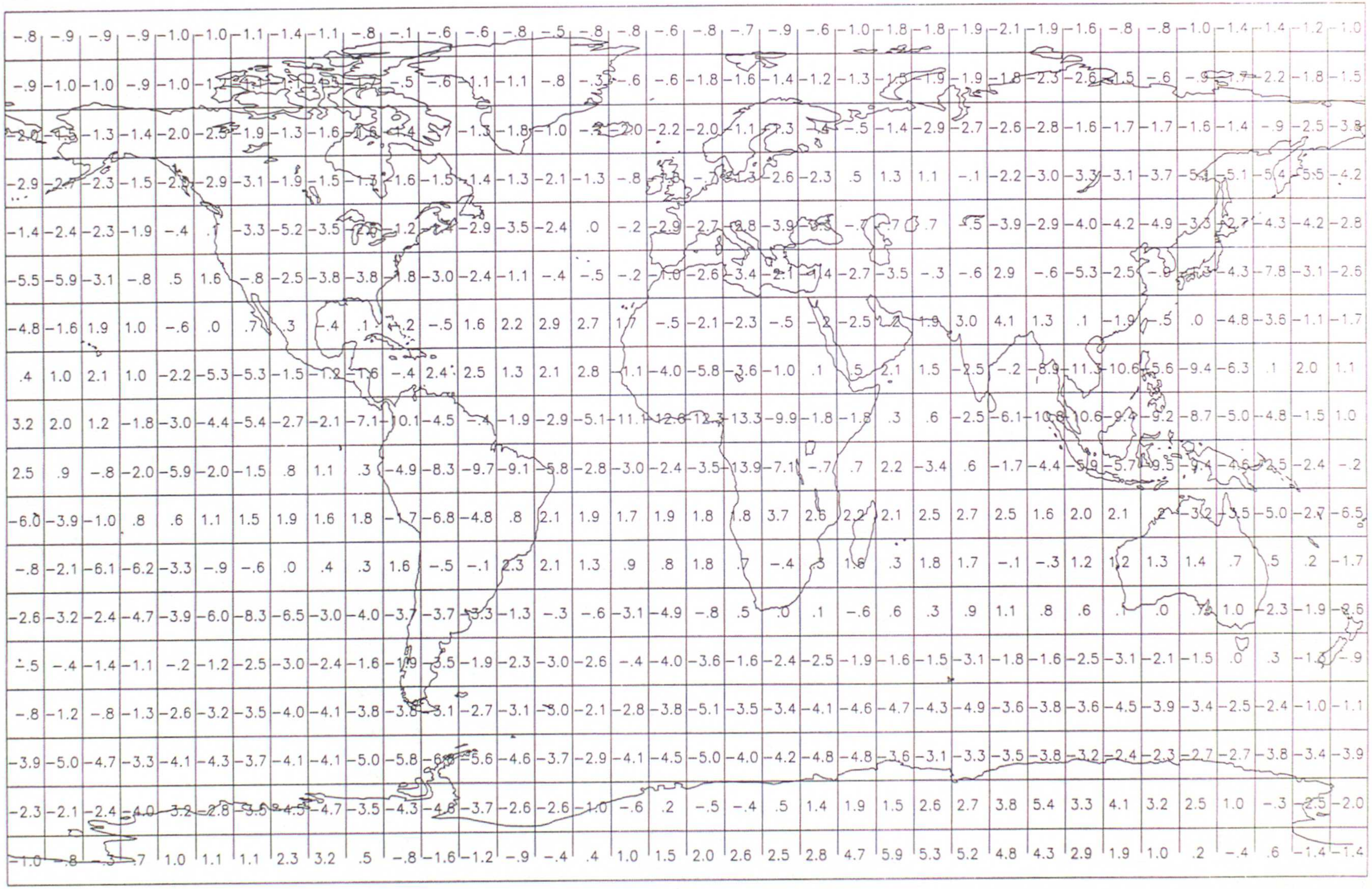
.4 .4 .4 .4 .3 .3 .3 .3 .4 .6 1.0 .7 .7 .7 .9 .8 .7 .9 .8 .8 .7 .7 .6 .3 .2 .0 -.1 .0 .0 .4 .4 .3 .2 .3 .3 .4
.4 .5 .5 .6 .5 .5 .6 .8 .6 .2 .2 .5 .8 .5 .2 -1.1 -1.0 -.4 -.3 -.1 .2 .1 .0 .0 -.4 -.6 .0 .6 .5 .2 -.1 -.1 0
-.8 -.6 -.2 -.5 -1.0 -1.3 -.8 -.5 -.5 -.6 -.2 -.3 -.7 -.4 -.7 -.8 -1.9 -2.3 -1.9 -.5 -.7 -.9 -1.4 -1.3 -2.1 -1.4 -1.1 -.9 -.1 .0 -.1 .0 .2 .5 -.9 -2.9
-2.6 -2.3 -2.1 -2.0 -2.3 -2.6 -3.1 -2.8 -1.4 -.6 -.8 -.8 -1.4 -1.7 -2.7 -2.3 -1.5 -1.0 -.8 -1.7 -3.1 -2.4 -.7 -.2 -.4 -.5 -1.8 -2.2 -2.2 -1.5 -1.9 -3.1 -3.2 -3.3 -4.7 -3.7
-2.0 -2.5 -2.8 -2.7 -1.4 -.6 -4.4 -5.9 -3.7 -2.3 -.7 -2.8 -3.3 -4.2 -3.6 -1.5 -1.5 -3.7 -3.1 -3.3 -4.2 -3.4 -1.8 -.6 -.6 -1.3 -3.4 -1.8 -2.1 -3.1 -3.8 -2.8 -2.8 -3.7 -4.0 -3.1
-6.8 -7.5 -4.2 -2.2 -1.1 .1 -2.3 -4.1 -4.1 -4.4 -3.1 -4.8 -4.1 -2.6 -1.6 -1.4 -1.0 -.9 -2.5 -3.9 -1.5 -1.1 -2.9 -3.7 -1.4 -1.0 1.8 -.3 -5.1 -3.7 -2.8 -2.7 -5.9 -9.2 -5.0 -3.8
-5.9 -2.9 -.2 -1.8 -2.8 -1.6 -.8 -1.5 -1.2 -.8 -2.1 -2.6 -.9 .1 .4 .4 .1 -1.4 -3.3 -2.6 .6 -.3 -3.7 -.5 .0 .0 1.4 -1.4 -2.9 -6.6 -4.4 -3.0 -7.7 -5.8 -3.3 -3.6
-1.3 -.8 -.2 -2.6 -4.4 -5.2 -5.6 -2.6 -1.8 -2.8 -2.7 -.5 .1 -1.1 -.2 .0 -2.3 -6.3 -6.2 -1.6 .3 -1.9 -.8 .5 -.1 -4.2 -2.7 -10.3 -12.8 -11.9 -6.1 -10.5 -8.1 -1.6 -.3 -1.3
-.3 -.7 -1.5 -3.8 -4.4 -5.1 -6.4 -4.5 -4.0 -9.0 -11.4 -7.4 -3.5 -4.1 -4.5 -5.7 -11.0 -13.2 -12.8 -13.1 -11.4 -6.0 -4.5 -1.3 -.6 -3.9 -7.3 -12.0 -11.2 -9.7 -10.3 -9.5 -6.6 -6.8 -3.2 -2.1
-.5 -.9 -2.3 -3.8 -6.9 -2.9 -2.6 -1.0 -.8 -1.0 -6.0 -10.2 -11.8 -10.5 -6.8 -4.4 -3.9 -4.4 -5.3 -14.4 -8.1 -2.3 -2.4 -.6 -4.1 -1.1 -2.4 -5.3 -6.7 -5.9 -9.1 -8.5 -4.7 -4.0 -4.7 -2.6
-6.9 -5.3 -2.2 -.9 -.9 -.6 -.4 -.3 -.8 -1.0 -2.7 -4.4 -4.3 -1.1 -1.0 -.6 -.2 -.1 .3 -.6 .5 .0 -.3 -.7 .1 .0 -.6 -1.6 -.7 -.2 -1.7 -5.1 -5.9 -7.1 -4.2 -7.1
-3.9 -4.0 -8.5 -8.4 -5.5 -2.8 -2.2 -1.7 -2.0 -1.9 -1.0 -.6 -1.1 -.5 -.5 -.9 -1.2 -1.7 -.5 -.2 -1.1 -1.9 -.8 -2.6 -1.2 -1.0 -2.4 -2.6 -.5 .5 .6 .4 -1.1 -1.4 -1.7 -3.6
-4.5 -5.6 -4.6 -6.3 -6.0 -7.7 -10.5 -8.8 -5.3 -6.0 -4.9 -4.9 -4.9 -3.3 -1.9 -2.7 -5.2 -6.7 -3.7 -1.3 -1.3 -1.6 -2.5 -1.9 -2.4 -2.0 -1.2 -1.1 -1.3 -1.4 -1.5 -.8 -.4 -3.9 -3.8 -4.6
-1.5 -1.9 -3.0 -2.4 -1.6 -2.6 -3.5 -3.9 -3.1 -2.5 -2.8 -4.3 -3.5 -3.6 -3.8 -3.4 -2.5 -4.6 -4.3 -2.7 -2.9 -3.0 -2.6 -2.3 -3.0 -3.7 -3.4 -2.8 -3.5 -3.8 -3.5 -2.8 -1.5 -1.3 -2.5 -2.0
-1.2 -1.9 -1.2 -1.7 -2.7 -3.2 -3.4 -3.7 -3.9 -3.5 -3.6 -3.1 -2.8 -2.8 -2.7 -2.2 -2.9 -3.7 -4.2 -3.1 -3.3 -3.9 -4.1 -4.1 -4.1 -4.2 -3.4 -3.2 -3.3 -4.1 -3.7 -3.3 -2.6 -3.1 -2.1 -1.4
-2.7 -3.6 -3.3 -2.2 -2.9 -2.8 -3.0 -3.3 -3.5 -4.3 -4.6 -5.0 -3.9 -2.9 -2.3 -1.7 -2.6 -2.8 -3.3 -2.8 -2.7 -3.0 -2.9 -1.7 -1.4 -1.5 -1.6 -1.8 -1.3 -1.0 -1.1 -1.3 -1.2 -2.2 -2.2 -2.6
-.4 -.4 -.5 -1.4 -1.0 -.6 -1.1 -2.0 -2.1 -1.4 -1.8 -1.7 -1.2 -.6 -.5 .4 .7 1.1 .8 .9 1.2 1.7 1.9 1.9 2.0 2.0 2.0 2.1 1.8 1.8 1.7 1.7 1.4 .9 .3 -.2
1.1 1.4 1.5 1.9 2.0 2.1 2.1 2.5 2.7 1.9 1.4 1.2 1.3 1.6 1.8 2.1 2.3 2.4 2.5 2.7 2.7 2.8 3.1 3.2 3.0 3.0 3.0 3.0 2.7 2.5 2.4 2.2 1.9 2.0 1.0 1.0

ATOVS : SD O-B TEMPERATURE DIFFERENCES (DEG C) : HIRS15 channel (700 hPa)
21/4/1999 to 30/4/1999 FIGURE 29
NOAA-15, USING ALL OBSERVATIONS

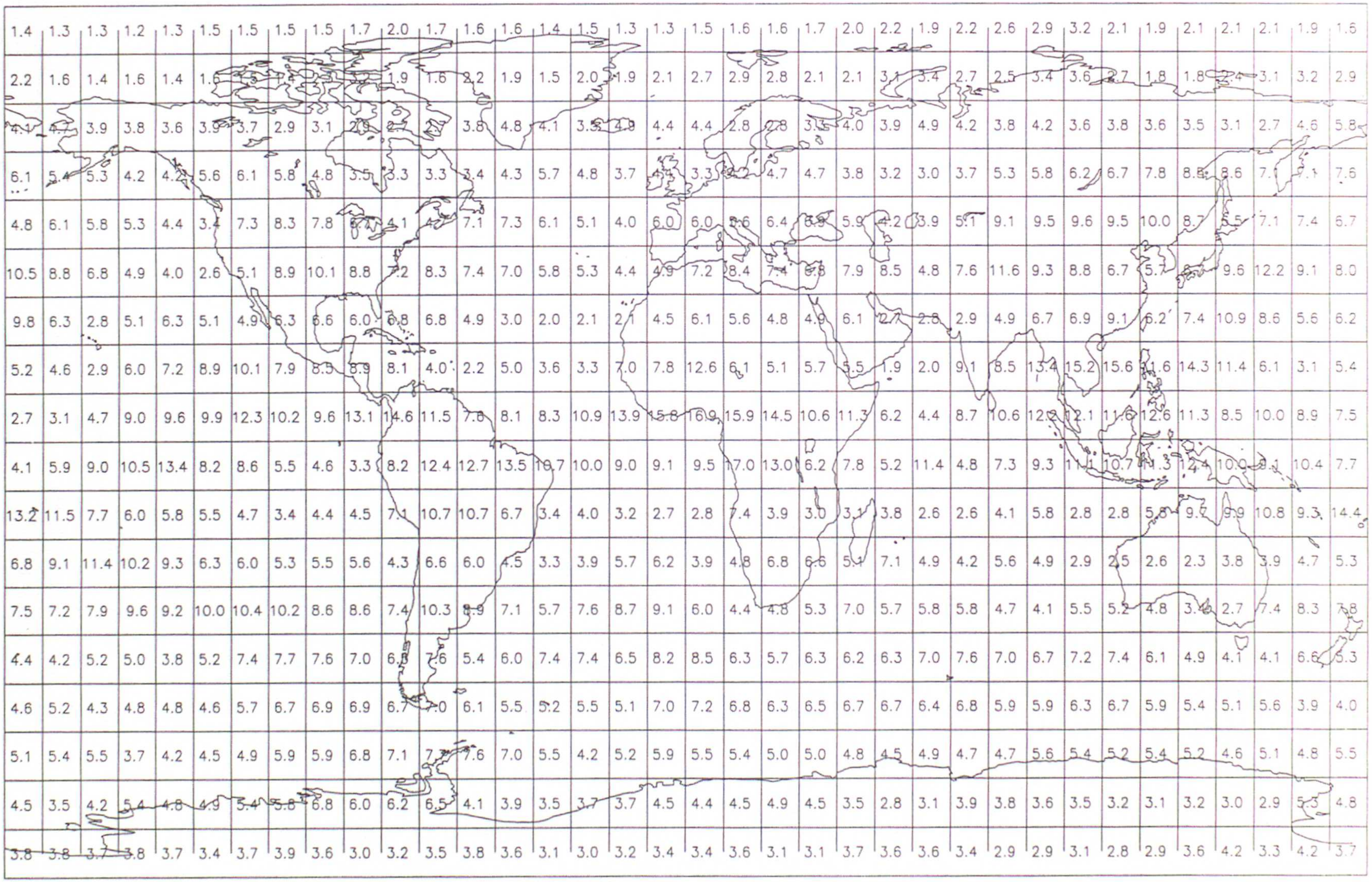

.5 .5 .5 .4 .5 .5 .5 .7 .7 .8 1.0 .7 .7 .7 .7 .8 .7 .7 .8 .9 .8 .8 .9 1.0 .9 1.1 1.3 1.7 2.0 1.1 1.0 1.1 1.2 1.1 1.0 .6
1.1 .8 .7 .8 .6 [illegible] .7 [illegible] [illegible] .9 1.1 .8 1.5 1.2 .9 1.1 1.1 1.7 2.0 2.1 2.1 1.6 1.4 1.6 1.8 1.6 1.4 1.9 2.1 2.4 .9 1.0 2.3 1.9 2.0 1.9
2.8 3.5 3.0 3.0 2.7 3.0 2.9 2.4 2.6 2.5 [illegible] 1.9 2.6 3.1 3.2 2.8 3.7 3.5 3.7 2.2 2.1 2.5 3.4 3.0 3.5 2.9 2.6 2.9 2.3 2.5 2.1 2.2 2.0 1.8 3.1 3.7
4.2 4.4 4.6 3.8 3.7 4.6 5.0 4.8 4.2 3.0 2.7 2.5 2.5 3.4 4.8 3.9 2.9 3.6 2.9 [illegible] 4.2 4.0 3.4 2.5 2.2 2.5 3.9 4.3 4.5 4.6 5.6 5.9 5.7 4.9 5.4 5.3
3.7 4.7 5.3 4.5 3.7 2.7 5.9 6.7 6.6 5.9 3.9 3.7 5.9 6.2 5.3 4.2 3.2 5.2 5.1 5.0 5.6 5.7 4.9 3.5 2.7 4.2 7.5 7.8 7.8 7.6 7.6 6.3 5.0 5.5 5.0 4.4
9.3 8.1 6.1 4.5 4.0 2.0 4.3 7.6 8.4 8.0 6.3 8.0 6.9 5.8 4.5 4.1 3.1 4.5 6.4 7.5 5.4 5.0 7.2 7.4 3.8 6.8 10.6 8.8 8.3 6.4 5.7 [illegible] 9.5 11.5 7.6 6.8
8.2 5.7 2.6 4.5 5.5 3.8 3.3 5.4 5.0 4.5 6.7 6.5 4.2 2.4 1.3 1.2 1.4 5.3 6.4 6.2 3.0 4.2 7.5 2.4 2.1 2.3 4.3 5.6 6.1 8.8 7.1 7.0 11.2 8.8 5.6 5.8
3.6 3.1 1.8 5.2 6.4 7.5 8.3 6.9 6.9 7.2 6.9 3.1 1.6 4.5 2.6 1.8 5.9 7.8 10.8 5.4 3.2 6.4 5.5 .9 2.2 8.5 7.2 11.9 13.8 14.2 10.0 12.9 10.6 5.0 2.4 4.5
2.0 2.5 4.5 8.0 8.5 9.3 11.2 9.5 8.6 12.1 12.8 10.9 7.3 7.6 7.7 9.7 12.6 13.8 14.4 13.8 13.3 9.7 10.0 5.4 3.1 7.5 9.3 11.3 11.1 11.1 11.8 10.7 8.8 9.4 7.3 6.1
3.6 5.3 7.5 9.2 11.5 7.0 7.2 4.6 3.9 3.1 8.0 11.4 11.6 12.6 9.7 8.6 7.1 7.9 8.6 14.8 11.8 5.6 6.9 4.2 9.3 3.5 5.4 8.3 9.8 9.4 10.3 10.8 8.7 8.3 9.0 6.8
11.8 10.4 6.5 4.9 4.0 3.6 2.9 1.8 2.6 3.1 5.8 9.2 8.9 4.6 2.8 2.7 2.0 1.5 1.4 5.4 2.4 2.3 2.8 3.5 1.7 1.9 3.3 4.8 2.5 2.7 5.6 [illegible] 9.0 10.2 8.5 12.7
6.9 8.6 10.7 10.0 8.8 5.6 5.2 4.5 5.1 5.0 3.4 5.2 4.7 3.0 2.9 3.3 4.5 4.4 2.6 3.7 5.7 6.2 4.5 7.4 4.7 4.3 5.2 5.1 2.8 2.2 1.7 1.7 4.0 3.8 4.2 5.8
7.3 6.8 7.1 9.2 8.4 9.6 10.0 9.7 7.7 7.4 6.6 8.7 8.0 6.4 4.9 6.3 7.8 8.3 5.9 3.5 4.1 4.8 6.3 4.7 4.9 4.7 3.7 2.7 3.9 4.4 4.0 2.7 2.2 6.4 7.2 7.0
3.7 3.5 4.4 4.3 3.2 4.4 6.6 6.4 6.6 5.9 5.8 6.7 4.8 5.2 5.9 5.6 4.7 6.8 7.1 4.9 4.8 5.2 4.8 4.7 5.6 5.7 5.5 5.1 5.3 5.6 4.7 3.9 3.1 2.9 5.8 4.4
3.0 3.9 3.1 3.7 3.4 3.8 4.3 4.7 5.1 5.3 4.8 5.3 4.6 4.1 3.8 3.8 3.8 4.8 5.3 5.3 5.0 5.4 5.5 5.0 5.0 5.4 4.6 4.1 4.2 4.8 4.3 4.2 3.6 3.8 2.9 2.9
3.4 3.8 3.8 2.4 2.7 3.0 3.2 4.1 4.2 5.3 5.4 5.8 6.0 5.0 3.7 2.6 3.6 4.3 4.1 4.1 3.8 3.5 3.5 3.2 3.5 3.2 3.3 3.7 3.5 3.3 3.1 3.2 2.9 3.6 3.2 3.7
3.1 2.3 2.5 3.2 2.9 2.9 3.2 3.7 4.4 4.1 4.5 4.2 2.6 2.3 2.3 2.1 1.7 1.6 2.1 2.3 2.5 2.1 1.5 1.3 1.2 1.3 1.4 1.3 1.3 1.2 1.1 1.1 1.1 1.4 2.7 2.8
1.7 1.5 1.5 1.6 1.7 1.6 1.7 1.7 1.5 1.6 1.8 1.7 1.8 1.6 1.4 1.2 1.1 1.1 1.1 1.2 1.2 1.3 1.3 1.3 1.4 1.4 1.3 1.3 1.3 1.3 1.2 1.3 1.4 1.5 2.0 1.8

ATOVS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : HIRS11 Channel (500-700 hPa)
21/4/1999 to 30/4/1999
NOAA-15, USING ALL OBSERVATIONS

FIGURE 30


-.8 -.9 -.9 -.9 -1.0 -1.0 -1.1 -1.4 -1.1 -.8 -.1 -.6 -.6 -.8 -.5 -.8 -.8 -.6 -.8 -.7 -.9 -.6 -1.0 -1.8 -1.8 -1.9 -2.1 -1.9 -1.6 -.8 -.8 -1.0 -1.4 -1.4 -1.2 -1.0
-.9 -1.0 -1.0 -.9 -1.0 -1.2 -1.1 -1.1 -2.5 -1.7 -.5 -.6 -1.1 -1.1 -.8 -.3 -.6 -.6 -1.8 -1.6 -1.4 -1.2 -1.3 -1.5 -1.9 -1.9 -1.8 -2.3 -2.6 -1.5 -.6 -.9 -1.7 -2.2 -1.8 -1.5
-2.0 -1.5 -1.3 -1.4 -2.0 -2.5 -1.9 -1.3 -1.6 -1.6 -1.4 -.7 -1.3 -1.8 -1.0 -.3 -2.0 -2.2 -2.0 -1.1 -1.3 -.4 -.5 -1.4 -2.9 -2.7 -2.6 -2.8 -1.6 -1.7 -1.7 -1.6 -1.4 -.9 -2.5 -3.8
-2.9 -2.7 -2.3 -1.5 -2.8 -2.9 -3.1 -1.9 -1.5 -1.3 -1.6 -1.5 -1.4 -1.3 -2.1 -1.3 -.8 -1.3 -.7 -1.3 -2.6 -2.3 .5 1.3 1.1 -.1 -2.2 -3.0 -3.3 -3.1 -3.7 -5.4 -5.1 -5.4 -5.5 -4.2
-1.4 -2.4 -2.3 -1.9 -.4 .1 -3.3 -5.2 -3.5 -2.6 -1.2 -2.4 -2.9 -3.5 -2.4 .0 -.2 -2.9 -2.7 -2.8 -3.9 -3.3 -.7 -.7 .7 -.5 -3.9 -2.9 -4.0 -4.2 -4.9 -3.3 -2.7 -4.3 -4.2 -2.8
-5.5 -5.9 -3.1 -.8 .5 1.6 -.8 -2.5 -3.8 -3.8 -1.8 -3.0 -2.4 -1.1 -.4 -.5 -.2 -1.0 -2.6 -3.4 -2.1 -1.4 -2.7 -3.5 -.3 -.6 2.9 -.6 -5.3 -2.5 -.9 -3.3 -4.3 -7.8 -3.1 -2.6
-4.8 -1.6 1.9 1.0 -.6 .0 .7 .3 -.4 .1 -.2 -.5 1.6 2.2 2.9 2.7 1.7 -.5 -2.1 -2.3 -.5 -.2 -2.5 .2 1.9 3.0 4.1 1.3 .1 -1.9 -.5 .0 -4.8 -3.6 -1.1 -1.7
.4 1.0 2.1 1.0 -2.2 -5.3 -5.3 -1.5 -1.2 -1.6 -.4 2.4 2.5 1.3 2.1 2.8 -1.1 -4.0 -5.8 -3.6 -1.0 .1 .5 2.1 1.5 -2.5 -.2 -8.9 -11.3 -10.6 -5.6 -9.4 -6.3 .1 2.0 1.1
3.2 2.0 1.2 -1.8 -3.0 -4.4 -5.4 -2.7 -2.1 -7.1 -10.1 -4.5 -.4 -1.9 -2.9 -5.1 -11.1 -12.6 -12.3 -13.3 -9.9 -1.8 -1.8 .3 .6 -2.5 -6.1 -10.8 -10.6 -9.4 -9.2 -8.7 -5.0 -4.8 -1.5 1.0
2.5 .9 -.8 -2.0 -5.9 -2.0 -1.5 .8 1.1 .3 -4.9 -8.3 -9.7 -9.1 -5.8 -2.8 -3.0 -2.4 -3.5 -13.9 -7.1 -.7 .7 2.2 -3.4 .6 -1.7 -4.4 -5.9 -5.7 -9.5 -9.4 -4.6 -2.5 -2.4 -.2
-6.0 -3.9 -1.0 .8 .6 1.1 1.5 1.9 1.6 1.8 -1.7 -6.8 -4.8 .8 2.1 1.9 1.7 1.9 1.8 1.8 3.7 2.6 2.2 2.1 2.5 2.7 2.5 1.6 2.0 2.1 .2 -3.2 -3.5 -5.0 -2.7 -6.5
-.8 -2.1 -6.1 -6.2 -3.3 -.9 -.6 .0 .4 .3 1.6 -.5 -.1 2.3 2.1 1.3 .9 .8 1.8 .7 -.4 .3 1.6 .3 1.8 1.7 -.1 -.3 1.2 1.2 1.3 1.4 .7 .5 .2 -1.7
-2.6 -3.2 -2.4 -4.7 -3.9 -6.0 -8.3 -6.5 -3.0 -4.0 -3.7 -3.7 -3.3 -1.3 -.3 -.6 -3.1 -4.9 -.8 .5 .0 .1 -.6 .6 .3 .9 1.1 .8 .6 .1 .0 .7 1.0 -2.3 -1.9 -2.6
-.5 -.4 -1.4 -1.1 -.2 -1.2 -2.5 -3.0 -2.4 -1.6 -1.9 -3.5 -1.9 -2.3 -3.0 -2.6 -.4 -4.0 -3.6 -1.6 -2.4 -2.5 -1.9 -1.6 -1.5 -3.1 -1.8 -1.6 -2.5 -3.1 -2.1 -1.5 .0 .3 -1.3 -.9
-.8 -1.2 -.8 -1.3 -2.6 -3.2 -3.5 -4.0 -4.1 -3.8 -3.8 -3.1 -2.7 -3.1 -3.0 -2.1 -2.8 -3.8 -5.1 -3.5 -3.4 -4.1 -4.6 -4.7 -4.3 -4.9 -3.6 -3.8 -3.6 -4.5 -3.9 -3.4 -2.5 -2.4 -1.0 -1.1
-3.9 -5.0 -4.7 -3.3 -4.1 -4.3 -3.7 -4.1 -4.1 -5.0 -5.8 -6.6 -5.6 -4.6 -3.7 -2.9 -4.1 -4.5 -5.0 -4.0 -4.2 -4.8 -4.8 -3.6 -3.1 -3.3 -3.5 -3.8 -3.2 -2.4 -2.3 -2.7 -2.7 -3.8 -3.4 -3.9
-2.3 -2.1 -2.4 -4.0 -3.2 -2.8 -3.5 -4.5 -4.7 -3.5 -4.3 -4.8 -3.7 -2.6 -2.6 -1.0 -.6 .2 -.5 -.4 .5 1.4 1.9 1.5 2.6 2.7 3.8 5.4 3.3 4.1 3.2 2.5 1.0 -.3 -2.5 -2.0
-1.0 -.8 -.3 .7 1.0 1.1 1.1 2.3 3.2 .5 -.8 -1.6 -1.2 -.9 -.4 .4 1.0 1.5 2.0 2.6 2.5 2.8 4.7 5.9 5.3 5.2 4.8 4.3 2.9 1.9 1.0 .2 -.4 .6 -1.4 -1.4

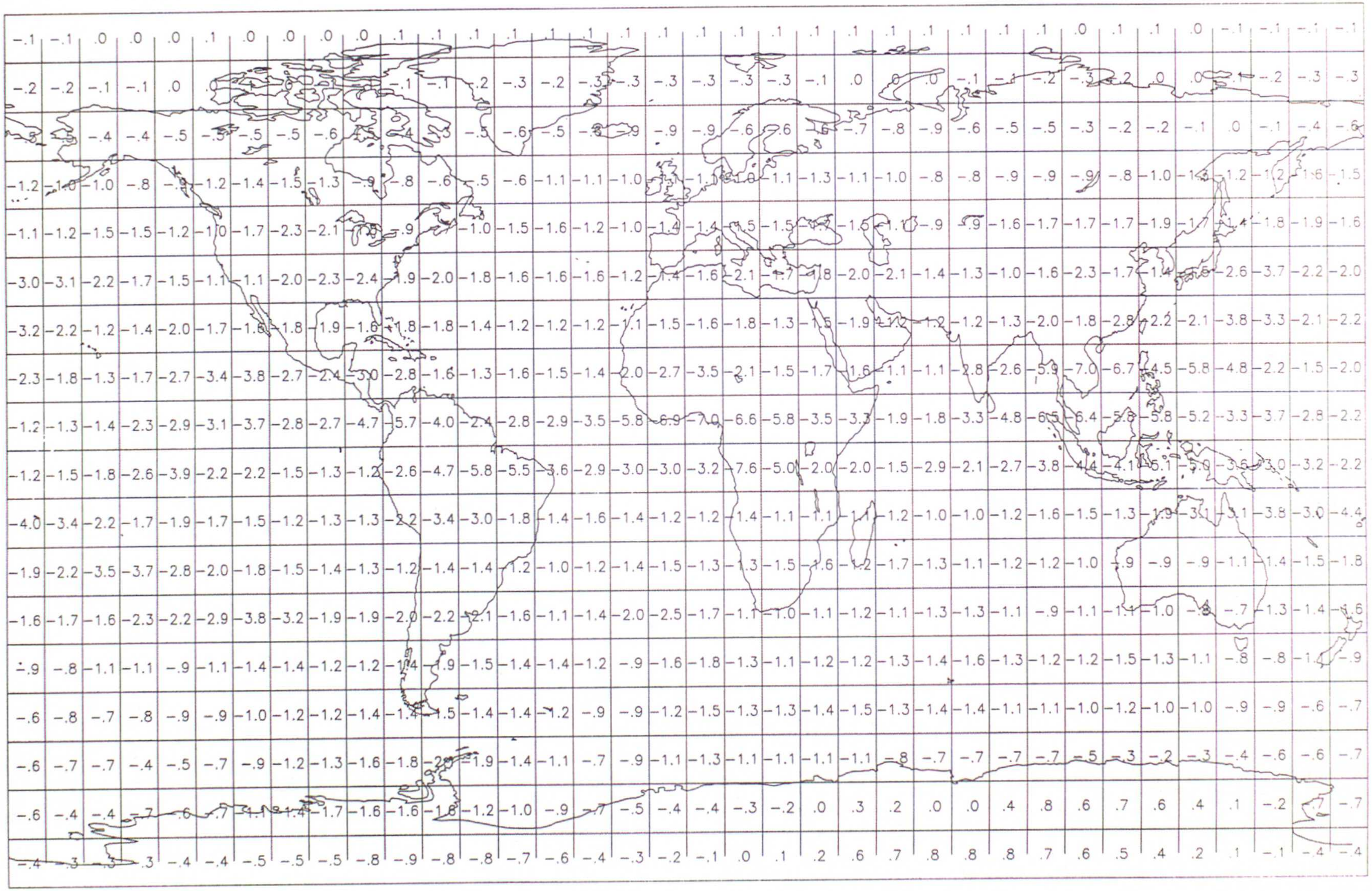
ATOVS : SD O-B TEMPERATURE DIFFERENCES (DEG C) : HIRS11 channel (500-700 hPa)
21/4/1999 to 30/4/1999
FIGURE 31
NOAA-15, USING ALL OBSERVATIONS



1.4	1.3	1.3	1.2	1.3	1.5	1.5	1.5	1.5	1.7	2.0	1.7	1.6	1.6	1.4	1.5	1.3	1.3	1.5	1.6	1.6	1.7	2.0	2.2	1.9	2.2	2.6	2.9	3.2	2.1	1.9	2.1	2.1	2.1	1.9	1.6
2.2	1.6	1.4	1.6	1.4	1.6	1.5	1.4	[illegible]	[illegible]	1.9	1.6	2.2	1.9	1.5	2.0	1.9	2.1	2.7	2.9	2.8	2.1	2.1	3.1	3.4	2.7	2.5	3.4	3.6	2.7	1.8	1.8	2.4	3.1	3.2	2.9
4.1	4.7	3.9	3.8	3.6	3.9	3.7	2.9	3.1	2.9	2.7	2.7	3.8	4.8	4.1	3.5	4.9	4.4	4.4	2.8	2.8	3.5	4.0	3.9	4.9	4.2	3.8	4.2	3.6	3.8	3.6	3.5	3.1	2.7	4.6	5.8
6.1	5.4	5.3	4.2	4.2	5.6	6.1	5.8	4.8	3.5	3.3	3.3	3.4	4.3	5.7	4.8	3.7	4.4	3.3	4.2	4.7	4.7	3.8	3.2	3.0	3.7	5.3	5.8	6.2	6.7	7.8	8.5	8.6	7.1	7.1	7.6
4.8	6.1	5.8	5.3	4.4	3.4	7.3	8.3	7.8	6.7	4.1	4.2	7.1	7.3	6.1	5.1	4.0	6.0	6.0	5.6	6.4	6.9	5.9	4.2	3.9	5.1	9.1	9.5	9.6	9.5	10.0	8.7	5.5	7.1	7.4	6.7
10.5	8.8	6.8	4.9	4.0	2.6	5.1	8.9	10.1	8.8	7.2	8.3	7.4	7.0	5.8	5.3	4.4	4.9	7.2	8.4	7.4	6.8	7.9	8.5	4.8	7.6	11.6	9.3	8.8	6.7	5.7	[illegible]	9.6	12.2	9.1	8.0
9.8	6.3	2.8	5.1	6.3	5.1	4.9	6.3	6.6	6.0	6.8	6.8	4.9	3.0	2.0	2.1	2.1	4.5	6.1	5.6	4.8	4.9	6.1	2.7	2.8	2.9	4.9	6.7	6.9	9.1	6.2	7.4	10.9	8.6	5.6	6.2
5.2	4.6	2.9	6.0	7.2	8.9	10.1	7.9	8.5	8.9	8.1	4.0	2.2	5.0	3.6	3.3	7.0	7.8	12.6	6.1	5.1	5.7	5.5	1.9	2.0	9.1	8.5	13.4	15.2	15.6	11.6	14.3	11.4	6.1	3.1	5.4
2.7	3.1	4.7	9.0	9.6	9.9	12.3	10.2	9.6	13.1	14.6	11.5	7.8	8.1	8.3	10.9	13.9	15.8	16.9	15.9	14.5	10.6	11.3	6.2	4.4	8.7	10.6	12.2	12.1	11.6	12.6	11.3	8.5	10.0	8.9	7.5
4.1	5.9	9.0	10.5	13.4	8.2	8.6	5.5	4.6	3.3	8.2	12.4	12.7	13.5	10.7	10.0	9.0	9.1	9.5	17.0	13.0	6.2	7.8	5.2	11.4	4.8	7.3	9.3	11.1	10.7	11.3	12.4	10.0	9.1	10.4	7.7
13.2	11.5	7.7	6.0	5.8	5.5	4.7	3.4	4.4	4.5	7.1	10.7	10.7	6.7	3.4	4.0	3.2	2.7	2.8	7.4	3.9	3.0	3.1	3.8	2.6	2.6	4.1	5.8	2.8	2.8	5.8	9.7	9.9	10.8	9.3	14.4
6.8	9.1	11.4	10.2	9.3	6.3	6.0	5.3	5.5	5.6	4.3	6.6	6.0	4.5	3.3	3.9	5.7	6.2	3.9	4.8	6.8	6.6	5.1	7.1	4.9	4.2	5.6	4.9	2.9	2.5	2.6	2.3	3.8	3.9	4.7	5.3
7.5	7.2	7.9	9.6	9.2	10.0	10.4	10.2	8.6	8.6	7.4	10.3	8.9	7.1	5.7	7.6	8.7	9.1	6.0	4.4	4.8	5.3	7.0	5.7	5.8	5.8	4.7	4.1	5.5	5.2	4.8	3.4	2.7	7.4	8.3	7.8
4.4	4.2	5.2	5.0	3.8	5.2	7.4	7.7	7.6	7.0	6.8	7.6	5.4	6.0	7.4	7.4	6.5	8.2	8.5	6.3	5.7	6.3	6.2	6.3	7.0	7.6	7.0	6.7	7.2	7.4	6.1	4.9	4.1	4.1	6.6	5.3
4.6	5.2	4.3	4.8	4.8	4.6	5.7	6.7	6.9	6.9	6.7	7.0	6.1	5.5	5.2	5.5	5.1	7.0	7.2	6.8	6.3	6.5	6.7	6.7	6.4	6.8	5.9	5.9	6.3	6.7	5.9	5.4	5.1	5.6	3.9	4.0
5.1	5.4	5.5	3.7	4.2	4.5	4.9	5.9	5.9	6.8	7.1	7.7	7.6	7.0	5.5	4.2	5.2	5.9	5.5	5.4	5.0	5.0	4.8	4.5	4.9	4.7	4.7	5.6	5.4	5.2	5.4	5.2	4.6	5.1	4.8	5.5
4.5	3.5	4.2	5.4	4.8	4.9	5.4	5.8	6.8	6.0	6.2	6.5	4.1	3.9	3.5	3.7	3.7	4.5	4.4	4.5	4.9	4.5	3.5	2.8	3.1	3.9	3.8	3.6	3.5	3.2	3.1	3.2	3.0	2.9	5.3	4.8
3.8	3.8	3.7	3.8	3.7	3.4	3.7	3.9	3.6	3.0	3.2	3.5	3.8	3.6	3.1	3.0	3.2	3.4	3.4	3.6	3.1	3.1	3.7	3.6	3.6	3.4	2.9	2.9	3.1	2.8	2.9	3.6	4.2	3.3	4.2	3.7

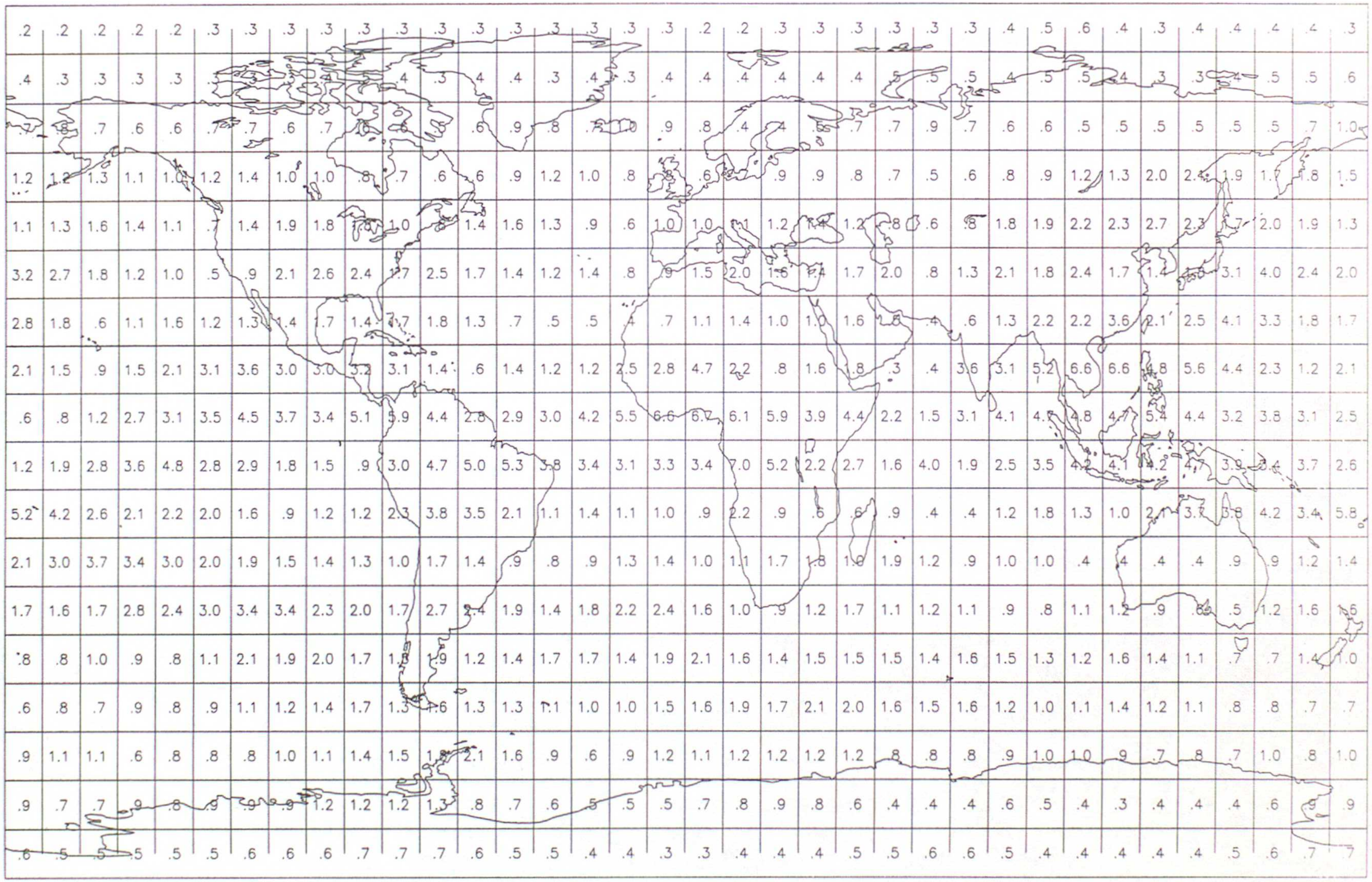
ATOVS : MEAN O–B TEMPERATURE DIFFERENCES (DEG C) : HIRS4 channel (400 hPa)
21/4/1999 to 30/4/1999
NOAA–15, USING ALL OBSERVATIONS

FIGURE 32



-.1	-.1	.0	.0	.0	.1	.0	.0	.0	.0	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.0	.1	.1	.0	-.1	-.1	-.1	-.1
-.2	-.2	-.1	-.1	.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-.1	-.1	.2	-.3	-.2	-.3	-.3	-.3	-.3	-.3	-.3	-.1	.0	.0	.0	-.1	-.1	-.2	-.3	.2	.0	.0	-.1	-.2	-.3	-.3
-.5	-.5	-.4	-.4	-.5	-.5	-.5	-.5	-.6	-.5	-.4	-.3	-.5	-.6	-.5	-.8	-.9	-.9	-.9	-.6	-.6	-.6	-.7	-.8	-.9	-.6	-.5	-.5	-.3	-.2	-.2	-.1	.0	-.1	-.4	-.6
-1.2	-1.0	-1.0	-.8	-.9	-1.2	-1.4	-1.5	-1.3	-.9	-.8	-.6	-.5	-.6	-1.1	-1.1	-1.0	-1.1	-1.1	-1.0	-1.1	-1.3	-1.1	-1.0	-.8	-.8	-.9	-.9	-.9	-.8	-1.0	-1.3	-1.2	-1.2	-1.6	-1.5
-1.1	-1.2	-1.5	-1.5	-1.2	-1.0	-1.7	-2.3	-2.1	-1.0	-.9	[illegible]	-1.0	-1.5	-1.6	-1.2	-1.0	-1.4	-1.4	-1.5	-1.5	-1.7	-1.6	-1.1	-.9	-.9	-1.6	-1.7	-1.7	-1.7	-1.9	-1.7	-1.4	-1.8	-1.9	-1.6
-3.0	-3.1	-2.2	-1.7	-1.5	-1.1	-1.1	-2.0	-2.3	-2.4	-1.9	-2.0	-1.8	-1.6	-1.6	-1.6	-1.2	-1.4	-1.6	-2.1	-1.7	-1.8	-2.0	-2.1	-1.4	-1.3	-1.0	-1.6	-2.3	-1.7	-1.4	[illegible]	-2.6	-3.7	-2.2	-2.0
-3.2	-2.2	-1.2	-1.4	-2.0	-1.7	-1.6	-1.8	-1.9	-1.6	-1.8	-1.8	-1.4	-1.2	-1.2	-1.2	-1.1	-1.5	-1.6	-1.8	-1.3	-1.5	-1.9	-1.2	-1.2	-1.2	-1.3	-2.0	-1.8	-2.8	-2.2	-2.1	-3.8	-3.3	-2.1	-2.2
-2.3	-1.8	-1.3	-1.7	-2.7	-3.4	-3.8	-2.7	-2.4	-3.0	-2.8	-1.6	-1.3	-1.6	-1.5	-1.4	-2.0	-2.7	-3.5	-2.1	-1.5	-1.7	-1.6	-1.1	-1.1	-2.8	-2.6	-5.9	-7.0	-6.7	-4.5	-5.8	-4.8	-2.2	-1.5	-2.0
-1.2	-1.3	-1.4	-2.3	-2.9	-3.1	-3.7	-2.8	-2.7	-4.7	-5.7	-4.0	-2.4	-2.8	-2.9	-3.5	-5.8	-6.9	-7.0	-6.6	-5.8	-3.5	-3.3	-1.9	-1.8	-3.3	-4.8	-6.5	-6.4	-5.8	-5.8	-5.2	-3.3	-3.7	-2.8	-2.2
-1.2	-1.5	-1.8	-2.6	-3.9	-2.2	-2.2	-1.5	-1.3	-1.2	-2.6	-4.7	-5.8	-5.5	-3.6	-2.9	-3.0	-3.0	-3.2	-7.6	-5.0	-2.0	-2.0	-1.5	-2.9	-2.1	-2.7	-3.8	-4.4	-4.1	-5.1	-5.0	-3.6	-3.0	-3.2	-2.2
-4.0	-3.4	-2.2	-1.7	-1.9	-1.7	-1.5	-1.2	-1.3	-1.3	-2.2	-3.4	-3.0	-1.8	-1.4	-1.6	-1.4	-1.2	-1.2	-1.4	-1.1	-1.1	-1.1	-1.2	-1.0	-1.0	-1.2	-1.6	-1.5	-1.3	-1.9	-3.1	-3.1	-3.8	-3.0	-4.4
-1.9	-2.2	-3.5	-3.7	-2.8	-2.0	-1.8	-1.5	-1.4	-1.3	-1.2	-1.4	-1.4	-1.2	-1.0	-1.2	-1.4	-1.5	-1.3	-1.3	-1.5	-1.6	-1.2	-1.7	-1.3	-1.1	-1.2	-1.2	-1.0	-.9	-.9	-.9	-1.1	-1.4	-1.5	-1.8
-1.6	-1.7	-1.6	-2.3	-2.2	-2.9	-3.8	-3.2	-1.9	-1.9	-2.0	-2.2	-2.1	-1.6	-1.1	-1.4	-2.0	-2.5	-1.7	-1.1	-1.0	-1.1	-1.2	-1.1	-1.3	-1.3	-1.1	-.9	-1.1	-1.1	-1.0	-.8	-.7	-1.3	-1.4	-1.6
-.9	-.8	-1.1	-1.1	-.9	-1.1	-1.4	-1.4	-1.2	-1.2	-1.4	-1.9	-1.5	-1.4	-1.4	-1.2	-.9	-1.6	-1.8	-1.3	-1.1	-1.2	-1.2	-1.3	-1.4	-1.6	-1.3	-1.2	-1.2	-1.5	-1.3	-1.1	-.8	-.8	-1.4	-.9
-.6	-.8	-.7	-.8	-.9	-.9	-1.0	-1.2	-1.2	-1.4	-1.4	-1.5	-1.4	-1.4	-1.2	-.9	-.9	-1.2	-1.5	-1.3	-1.3	-1.4	-1.5	-1.3	-1.4	-1.4	-1.1	-1.1	-1.0	-1.2	-1.0	-1.0	-.9	-.9	-.6	-.7
-.6	-.7	-.7	-.4	-.5	-.7	-.9	-1.2	-1.3	-1.6	-1.8	-2.0	-1.9	-1.4	-1.1	-.7	-.9	-1.1	-1.3	-1.1	-1.1	-1.1	-1.1	-.8	-.7	-.7	-.7	-.7	-.5	-.3	-.2	-.3	-.4	-.6	-.6	-.7
-.6	-.4	-.4	-.7	-.6	-.7	-1.1	-1.4	-1.7	-1.6	-1.6	-1.8	-1.2	-1.0	-.9	-.7	-.5	-.4	-.4	-.3	-.2	.0	.3	.2	.0	.0	.4	.8	.6	.7	.6	.4	.1	-.2	-.7	-.7
-.4	-.3	-.3	-.3	-.4	-.4	-.5	-.5	-.5	-.8	-.9	-.8	-.8	-.7	-.6	-.4	-.3	-.2	-.1	.0	.1	.2	.6	.7	.8	.8	.8	.7	.6	.5	.4	.2	.1	-.1	-.4	-.4

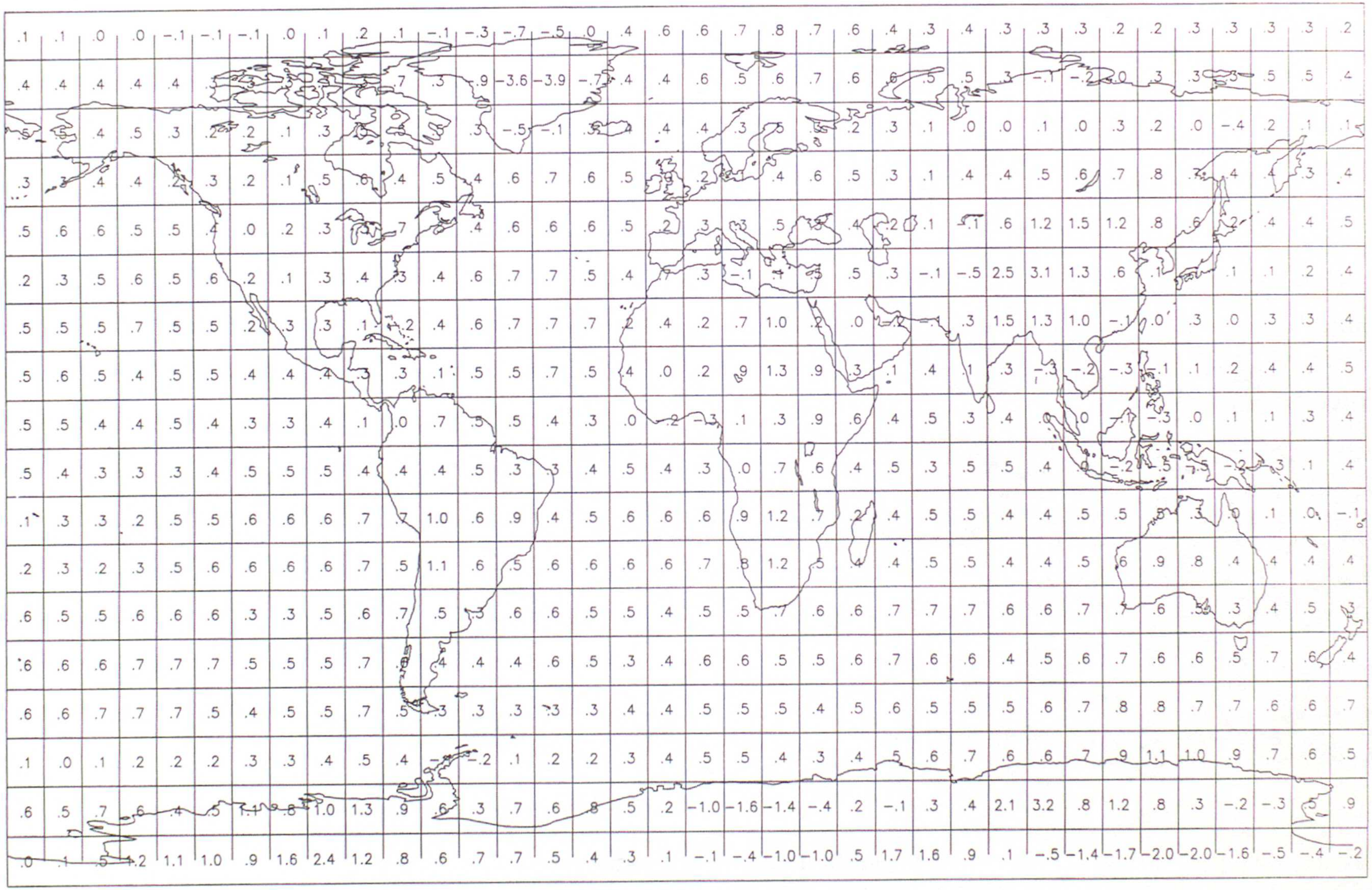
ATOVS : SD O-B TEMPERATURE DIFFERENCES (DEG C) : HIRS4 channel (400 hPa)
21/4/1999 to 30/4/1999 FIGURE 33
NOAA-15, USING ALL OBSERVATIONS



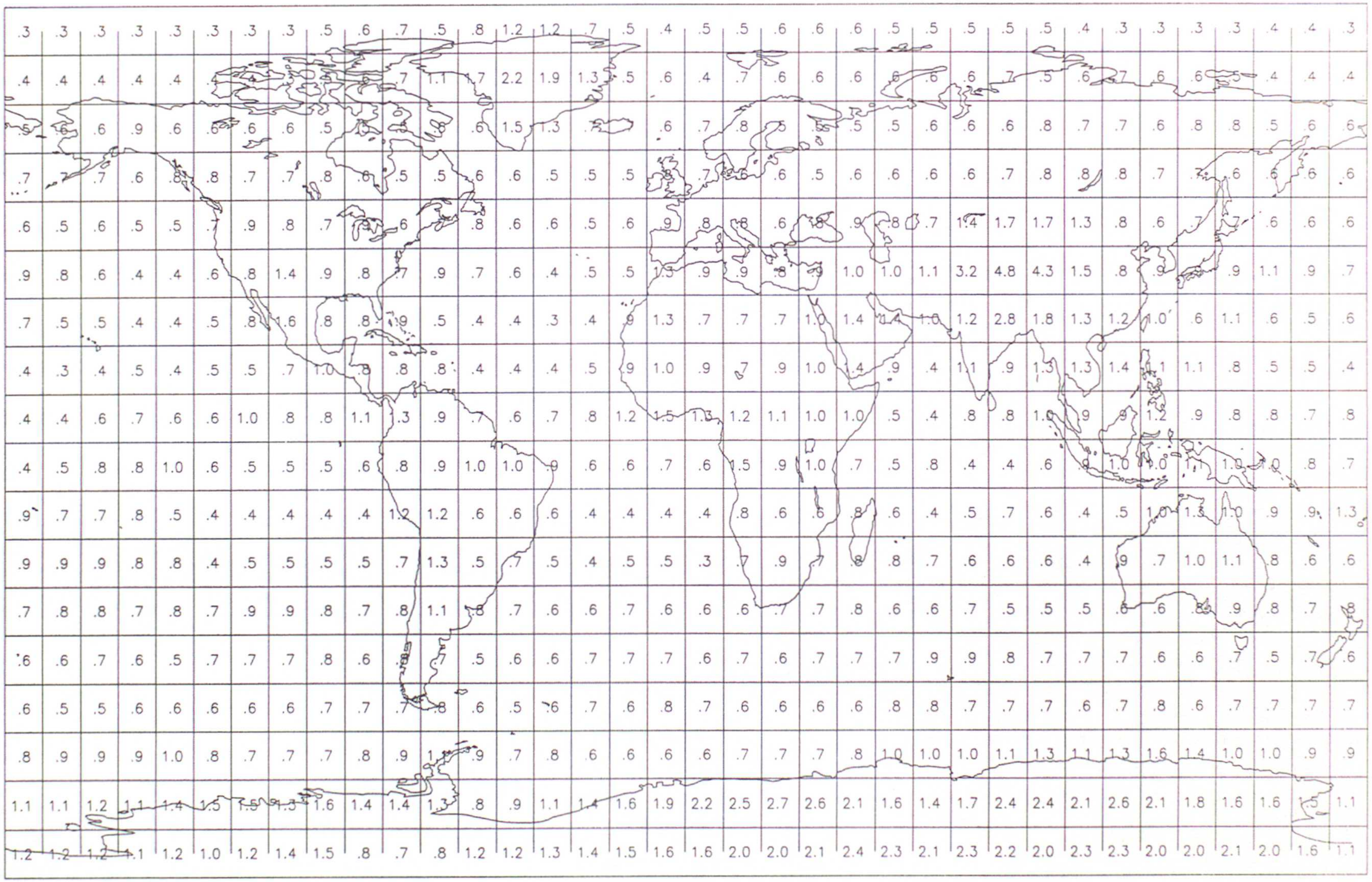
.2	.2	.2	.2	.2	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.2	.2	.3	.3	.3	.3	.3	.3	.4	.5	.6	.4	.3	.4	.4	.4	.4	.3
.4	.3	.3	.3	.3	.3	.3		.4		.4	.3	.4	.4	.3	.4	.3	.4	.4	.4	.4	.4	.4	.5	.5	.5	.4	.5	.5	.4	.3	.3	.4	.5	.5	.6
.7	.8	.7	.6	.6	.7	.7	.6	.7	.6	.6	.5	.6	.9	.8	.7	1.0	.9	.8	.4	.4	.5	.7	.7	.9	.7	.6	.6	.5	.5	.5	.5	.5	.5	.7	1.0
1.2	1.2	1.3	1.1	1.0	1.2	1.4	1.0	1.0	.8	.7	.6	.6	.9	1.2	1.0	.8	.8	.6		.9	.9	.8	.7	.5	.6	.8	.9	1.2	1.3	2.0	2.4	1.9	1.7	1.8	1.5
1.1	1.3	1.6	1.4	1.1	.7	1.4	1.9	1.8	1.8	1.0	.8	1.4	1.6	1.3	.9	.6	1.0	1.0	1.1	1.2	1.4	1.2	.8	.6	.8	1.8	1.9	2.2	2.3	2.7	2.3	1.7	2.0	1.9	1.3
3.2	2.7	1.8	1.2	1.0	.5	.9	2.1	2.6	2.4	1.7	2.5	1.7	1.4	1.2	1.4	.8	.9	1.5	2.0	1.6	1.4	1.7	2.0	.8	1.3	2.1	1.8	2.4	1.7	1.4	1.5	3.1	4.0	2.4	2.0
2.8	1.8	.6	1.1	1.6	1.2	1.3	1.4	1.7	1.4	1.7	1.8	1.3	.7	.5	.5	.4	.7	1.1	1.4	1.0	1.0	1.6	.8	.4	.6	1.3	2.2	2.2	3.6	2.1	2.5	4.1	3.3	1.8	1.7
2.1	1.5	.9	1.5	2.1	3.1	3.6	3.0	3.0	3.2	3.1	1.4	.6	1.4	1.2	1.2	2.5	2.8	4.7	2.2	.8	1.6	1.8	.3	.4	3.6	3.1	5.2	6.6	6.6	4.8	5.6	4.4	2.3	1.2	2.1
.6	.8	1.2	2.7	3.1	3.5	4.5	3.7	3.4	5.1	5.9	4.4	2.8	2.9	3.0	4.2	5.5	6.6	6.7	6.1	5.9	3.9	4.4	2.2	1.5	3.1	4.1	4.7	4.8	4.7	5.4	4.4	3.2	3.8	3.1	2.5
1.2	1.9	2.8	3.6	4.8	2.8	2.9	1.8	1.5	.9	3.0	4.7	5.0	5.3	3.8	3.4	3.1	3.3	3.4	7.0	5.2	2.2	2.7	1.6	4.0	1.9	2.5	3.5	4.2	4.1	4.2	4.7	3.9	3.4	3.7	2.6
5.2	4.2	2.6	2.1	2.2	2.0	1.6	.9	1.2	1.2	2.3	3.8	3.5	2.1	1.1	1.4	1.1	1.0	.9	2.2	.9	.6	.6	.9	.4	.4	1.2	1.8	1.3	1.0	2.1	3.7	3.8	4.2	3.4	5.8
2.1	3.0	3.7	3.4	3.0	2.0	1.9	1.5	1.4	1.3	1.0	1.7	1.4	.9	.8	.9	1.3	1.4	1.0	1.1	1.7	1.8	1.0	1.9	1.2	.9	1.0	1.0	.4	.4	.4	.4	.9	.9	1.2	1.4
1.7	1.6	1.7	2.8	2.4	3.0	3.4	3.4	2.3	2.0	1.7	2.7	2.4	1.9	1.4	1.8	2.2	2.4	1.6	1.0	.9	1.2	1.7	1.1	1.2	1.1	.9	.8	1.1	1.2	.9	.6	.5	1.2	1.6	1.6
.8	.8	1.0	.9	.8	1.1	2.1	1.9	2.0	1.7	1.8	1.9	1.2	1.4	1.7	1.7	1.4	1.9	2.1	1.6	1.4	1.5	1.5	1.5	1.4	1.6	1.5	1.3	1.2	1.6	1.4	1.1	.7	.7	1.4	1.0
.6	.8	.7	.9	.8	.9	1.1	1.2	1.4	1.7	1.3	1.6	1.3	1.3	1.1	1.0	1.0	1.5	1.6	1.9	1.7	2.1	2.0	1.6	1.5	1.6	1.2	1.0	1.1	1.4	1.2	1.1	.8	.8	.7	.7
.9	1.1	1.1	.6	.8	.8	.8	1.0	1.1	1.4	1.5	1.8	2.1	1.6	.9	.6	.9	1.2	1.1	1.2	1.2	1.2	1.2	.8	.8	.8	.9	1.0	1.0	.9	.7	.8	.7	1.0	.8	1.0
.9	.7	.7	.9	.8	.9	.9	.9	1.2	1.2	1.2	1.3	.8	.7	.6	.5	.5	.5	.7	.8	.9	.8	.6	.4	.4	.4	.6	.5	.4	.3	.4	.4	.4	.6	.9	.9
.6	.5	.5	.5	.5	.5	.6	.6	.6	.7	.7	.7	.6	.5	.5	.4	.4	.3	.3	.4	.4	.4	.5	.5	.6	.6	.5	.4	.4	.4	.4	.4	.5	.6	.7	.7

ATOVS : MEAN O–B TEMPERATURE DIFFERENCES (DEG C) : AMSUA–5 Channel (700 hPa)
21/4/1999 to 30/4/1999
NOAA–15, USING ALL OBSERVATIONS

FIGURE 34

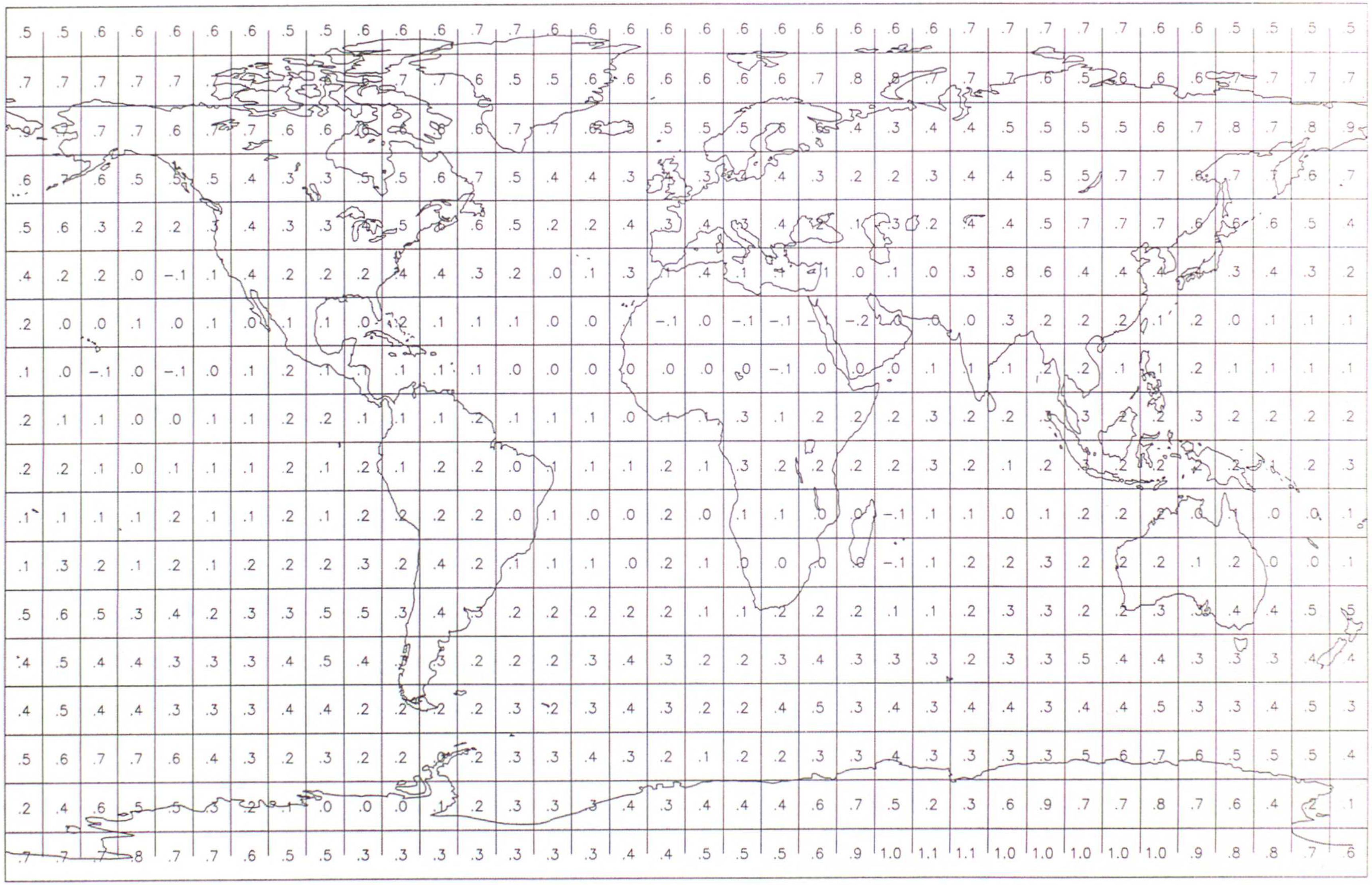


ATOVS : SD O-B TEMPERATURE DIFFERENCES (DEG C) : AMSUA-5 channel (700 hPa)
21/4/1999 to 30/4/1999 FIGURE 35
NOAA-15, USING ALL OBSERVATIONS

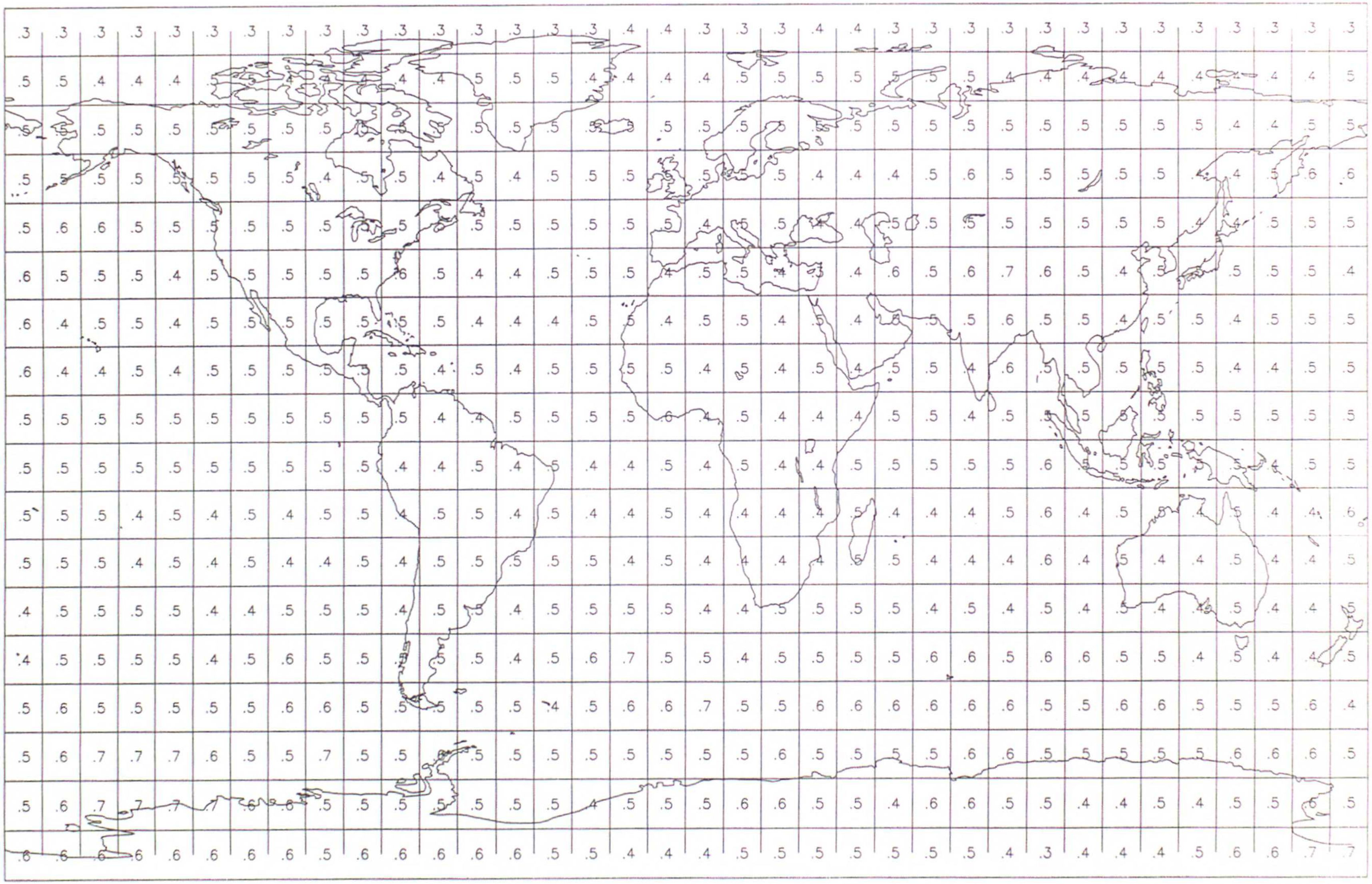


.3	.3	.3	.3	.3	.3	.3	.3	.5	.6	.7	.5	.8	1.2	1.2	.7	.5	.4	.5	.5	.6	.6	.6	.5	.5	.5	.5	.5	.4	.3	.3	.3	.3	.4	.4	.3
.4	.4	.4	.4	.4	.4	.4	[illegible]	.5	.6	.7	1.1	1.7	2.2	1.9	1.3	.5	.6	.4	.7	.6	.6	.6	.6	.6	.6	.7	.5	.6	.7	.6	.6	.5	.4	.4	.4
.5	.6	.6	.9	.6	.6	.6	.6	.5	.5	.8	.8	.6	1.5	1.3	.7	[illegible]	.6	.7	.8	.5	.5	.5	.5	.6	.6	.6	.8	.7	.7	.6	.8	.8	.5	.6	.6
.7	.7	.7	.6	.8	.8	.7	.7	.8	.6	.5	.5	.6	.6	.5	.5	.5	.8	.7	.6	.6	.5	.6	.6	.6	.6	.7	.8	.8	.8	.7	.7	.6	.6	.6	.6
.6	.5	.6	.5	.5	.7	.9	.8	.7	.9	.6		.8	.6	.6	.5	.6	.9	.8	.8	.6	.8	.9	.8	.7	1.4	1.7	1.7	1.3	.8	.6	.7	.7	.6	.6	.6
.9	.8	.6	.4	.4	.6	.8	1.4	.9	.8	.7	.9	.7	.6	.4	.5	.5	1.3	.9	.9	.8	.9	1.0	1.0	1.1	3.2	4.8	4.3	1.5	.8	.9	[illegible]	.9	1.1	.9	.7
.7	.5	.5	.4	.4	.5	.8	1.6	.8	.8	.9	.5	.4	.4	.3	.4	.9	1.3	.7	.7	.7	1.0	1.4	1.4	1.0	1.2	2.8	1.8	1.3	1.2	1.0	.6	1.1	.6	.5	.6
.4	.3	.4	.5	.4	.5	.5	.7	1.0	.8	.8	.8	.4	.4	.4	.5	.9	1.0	.9	.7	.9	1.0	1.4	.9	.4	1.1	.9	1.3	1.3	1.4	1.1	1.1	.8	.5	.5	.4
.4	.4	.6	.7	.6	.6	1.0	.8	.8	1.1	1.3	.9	.7	.6	.7	.8	1.2	1.5	1.3	1.2	1.1	1.0	1.0	.5	.4	.8	.8	1.0	.9	.9	1.2	.9	.8	.8	.7	.8
.4	.5	.8	.8	1.0	.6	.5	.5	.5	.6	.8	.9	1.0	1.0	.9	.6	.6	.7	.6	1.5	.9	1.0	.7	.5	.8	.4	.4	.6	.9	1.0	1.0	1.1	1.0	1.0	.8	.7
.9	.7	.7	.8	.5	.4	.4	.4	.4	.4	1.2	1.2	.6	.6	.6	.4	.4	.4	.4	.8	.6	.6	.8	.6	.4	.5	.7	.6	.4	.5	1.0	1.3	1.0	.9	.9	1.3
.9	.9	.9	.8	.8	.4	.5	.5	.5	.5	.7	1.3	.5	.7	.5	.4	.5	.5	.3	.7	.9	.7	.8	.8	.7	.6	.6	.6	.4	.9	.7	1.0	1.1	.8	.6	.6
.7	.8	.8	.7	.8	.7	.9	.9	.8	.7	.8	1.1	.8	.7	.6	.6	.7	.6	.6	.6	.7	.7	.8	.6	.6	.7	.5	.5	.5	.6	.6	.8	.9	.8	.7	.8
.6	.6	.7	.6	.5	.7	.7	.7	.8	.6	.8	.7	.5	.6	.6	.7	.7	.7	.6	.7	.6	.7	.7	.7	.9	.9	.8	.7	.7	.7	.6	.6	.7	.5	.7	.6
.6	.5	.5	.6	.6	.6	.6	.6	.7	.7	.7	.8	.6	.5	.6	.7	.6	.8	.7	.6	.6	.6	.6	.8	.8	.7	.7	.7	.6	.7	.8	.6	.7	.7	.7	.7
.8	.9	.9	.9	1.0	.8	.7	.7	.7	.8	.9	[illegible]	.9	.7	.8	.6	.6	.6	.6	.7	.7	.7	.8	1.0	1.0	1.0	1.1	1.3	1.1	1.3	1.6	1.4	1.0	1.0	.9	.9
1.1	1.1	1.2	1.1	1.4	1.5	1.5	1.3	1.6	1.4	1.4	1.3	.8	.9	1.1	1.4	1.6	1.9	2.2	2.5	2.7	2.6	2.1	1.6	1.4	1.7	2.4	2.4	2.1	2.6	2.1	1.8	1.6	1.6	1.5	1.1
1.2	1.2	1.2	1.1	1.2	1.0	1.2	1.4	1.5	.8	.7	.8	1.2	1.2	1.3	1.4	1.5	1.6	1.6	2.0	2.0	2.1	2.4	2.3	2.1	2.3	2.2	2.0	2.3	2.3	2.0	2.0	2.1	2.0	1.6	1.1

ATOVS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : AMSUA-7 Channel (300 hPa)
21/4/1999 to 30/4/1999 FIGURE 36
NOAA-15, USING ALL OBSERVATIONS

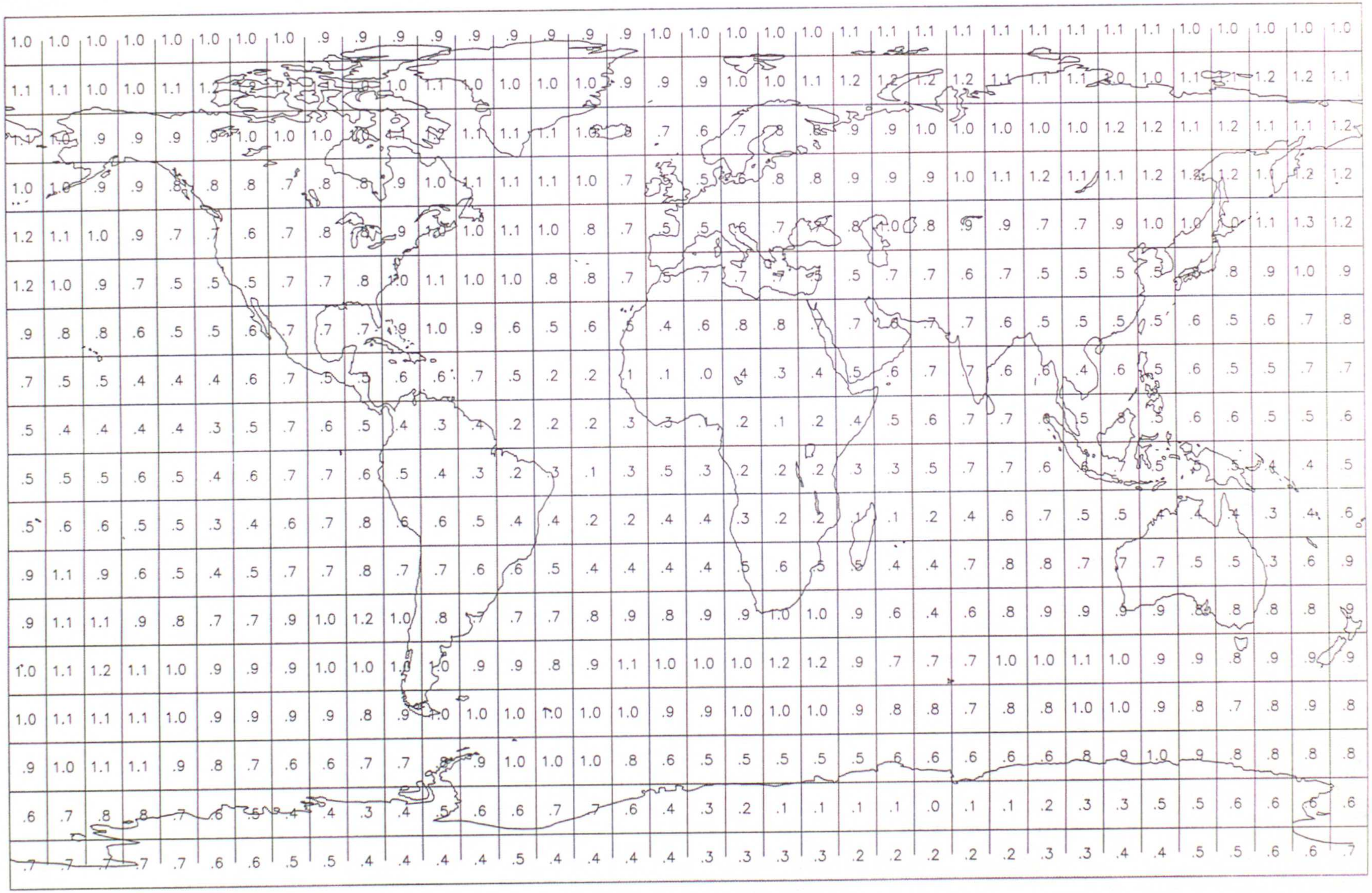

.5 .5 .6 .6 .6 .6 .6 .5 .5 .6 .6 .6 .7 .7 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .7 .7 .7 .7 .7 .6 .6 .5 .5 .5 .5
.7 .7 .7 .7 .7 .7 .7 .7 .7 .6 .5 .5 .6 .6 .6 .6 .6 .6 .7 .8 .8 .7 .7 .7 .6 .5 .6 .6 .6 .7 .7 .7 .7
.9 .7 .7 .7 .6 .7 .7 .6 .6 .6 .6 .8 .6 .7 .7 .6 .3 .5 .5 .5 .6 .6 .4 .3 .4 .4 .5 .5 .5 .5 .6 .7 .8 .7 .8 .9
.6 .7 .6 .5 .5 .5 .4 .3 .3 .5 .5 .6 .7 .5 .4 .4 .3 .4 .3 .4 .4 .3 .2 .2 .3 .4 .4 .5 .5 .7 .7 .6 .7 .7 .6 .7
.5 .6 .3 .2 .2 .3 .4 .3 .3 .4 .5 .6 .6 .5 .2 .2 .4 .3 .4 .3 .4 .2 .1 .3 .2 .4 .4 .5 .7 .7 .7 .6 .6 .6 .5 .4
.4 .2 .2 .0 −.1 .1 .4 .2 .2 .2 .4 .4 .3 .2 .0 .1 .3 .1 .4 .1 .1 .1 .0 .1 .0 .3 .8 .6 .4 .4 .4 .4 .3 .4 .3 .2
.2 .0 .0 .1 .0 .1 .0 .1 .1 .0 .2 .1 .1 .1 .0 .0 .1 −.1 .0 −.1 −.1 −.1 −.2 .0 .0 .0 .3 .2 .2 .2 .1 .2 .0 .1 .1 .1
.1 .0 −.1 .0 −.1 .0 .1 .2 .1 .1 .1 .1 .1 .0 .0 .0 .0 .0 .0 .0 −.1 .0 .0 .0 .1 .1 .1 .2 .2 .1 .1 .2 .1 .1 .1 .1
.2 .1 .1 .0 .0 .1 .1 .2 .2 .1 .1 .1 .2 .1 .1 .1 .0 .1 .1 .3 .1 .2 .2 .2 .3 .2 .2 .3 .3 .2 .2 .3 .2 .2 .2 .2
.2 .2 .1 .0 .1 .1 .1 .2 .1 .2 .1 .2 .2 .0 .1 .1 .1 .2 .1 .3 .2 .2 .2 .2 .3 .2 .1 .2 .3 .2 .2 .2 .2 .1 .2 .3
.1 .1 .1 .1 .2 .1 .1 .2 .1 .2 .2 .2 .2 .0 .1 .0 .0 .2 .0 .1 .1 .0 .0 −.1 .1 .1 .0 .1 .2 .2 .2 .0 .1 .0 .0 .1
.1 .3 .2 .1 .2 .1 .2 .2 .2 .3 .2 .4 .2 .1 .1 .1 .0 .2 .1 .0 .0 .0 .0 −.1 .1 .2 .2 .3 .2 .2 .2 .1 .2 .0 .0 .1
.5 .6 .5 .3 .4 .2 .3 .3 .5 .5 .3 .4 .3 .2 .2 .2 .2 .2 .1 .1 .2 .2 .2 .1 .1 .2 .3 .3 .2 .2 .3 .3 .4 .4 .5 .5
.4 .5 .4 .4 .3 .3 .3 .4 .5 .4 .3 .3 .2 .2 .2 .3 .4 .3 .2 .2 .3 .4 .3 .3 .3 .2 .3 .3 .5 .4 .4 .3 .3 .3 .4 .4
.4 .5 .4 .4 .3 .3 .3 .4 .4 .2 .2 .2 .2 .3 .2 .3 .4 .3 .2 .2 .4 .5 .3 .4 .3 .4 .4 .3 .4 .4 .5 .3 .3 .4 .5 .3
.5 .6 .7 .7 .6 .4 .3 .2 .3 .2 .2 .0 .2 .3 .3 .4 .3 .2 .1 .2 .2 .3 .3 .4 .3 .3 .3 .3 .5 .6 .7 .6 .5 .5 .5 .4
.2 .4 .6 .5 .5 .3 .2 .1 .0 .0 .0 .1 .2 .3 .3 .3 .4 .3 .4 .4 .4 .6 .7 .5 .2 .3 .6 .9 .7 .7 .8 .7 .6 .4 .2 .1
.7 .7 .7 .8 .7 .7 .6 .5 .5 .3 .3 .3 .3 .3 .3 .3 .4 .4 .5 .5 .5 .6 .9 1.0 1.1 1.1 1.0 1.0 1.0 1.0 1.0 .9 .8 .8 .7 .6

ATOVS : SD O-B TEMPERATURE DIFFERENCES (DEG C) : AMSUA-7 channel (300 hPa)
21/4/1999 to 30/4/1999
FIGURE 37
NOAA-15, USING ALL OBSERVATIONS



ATOVS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : AMSUA-9 Channel (100 hPa)
21/4/1999 to 30/4/1999
NOAA-15, USING ALL OBSERVATIONS

FIGURE 38


1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .9 .9 .9 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.0 1.0 1.0 1.0 1.0
1.1 1.1 1.0 1.0 1.1 1.2 1.0 1.1 .0 1.0 1.0 1.0 .9 .9 .9 1.0 1.0 1.1 1.2 1.2 1.2 1.2 1.1 1.1 1.1 .0 1.0 1.1 1.2 1.2 1.1
1.1 1.0 .9 .9 .9 .9 1.0 1.0 1.0 1.1 1.1 1.1 1.0 .8 .7 .6 .7 .8 .8 .9 .9 1.0 1.0 1.0 1.0 1.0 1.2 1.2 1.1 1.2 1.1 1.1 1.2
1.0 1.0 .9 .9 .8 .8 .8 .7 .8 .8 .9 1.0 1.1 1.1 1.1 1.1 1.0 .7 .5 .5 .8 .8 .9 .9 .9 1.0 1.1 1.2 1.1 1.1 1.2 1.2 1.2 1.1 1.2 1.2
1.2 1.1 1.0 .9 .7 .7 .6 .7 .8 .9 .9 1.0 1.1 1.0 .8 .7 .5 .5 .6 .7 .8 1.0 .8 .9 .9 .7 .7 .9 1.0 1.0 1.0 1.1 1.3 1.2
1.2 1.0 .9 .7 .5 .5 .5 .7 .7 .8 1.0 1.1 1.0 1.0 .8 .8 .7 .5 .7 .7 .7 .5 .5 .7 .7 .6 .7 .5 .5 .5 .5 .8 .9 1.0 .9
.9 .8 .8 .6 .5 .5 .6 .7 .7 .7 .9 1.0 .9 .6 .5 .6 .5 .4 .6 .8 .8 .7 .7 .6 .7 .7 .6 .5 .5 .5 .5 .6 .5 .6 .7 .8
.7 .5 .5 .4 .4 .4 .6 .7 .5 .5 .6 .6 .7 .5 .2 .2 .1 .1 .0 .4 .3 .4 .5 .6 .7 .7 .6 .6 .4 .6 .5 .6 .5 .5 .7 .7
.5 .4 .4 .4 .4 .3 .5 .7 .6 .5 .4 .3 .4 .2 .2 .2 .3 .3 .2 .1 .2 .4 .5 .6 .7 .7 .6 .5 .8 .5 .6 .6 .5 .5 .6
.5 .5 .5 .6 .5 .4 .6 .7 .7 .6 .5 .4 .3 .2 .3 .1 .3 .5 .3 .2 .2 .2 .3 .3 .5 .7 .7 .6 .6 .7 .5 .5 .4 .4 .5
.5 .6 .6 .5 .5 .3 .4 .6 .7 .8 .6 .6 .5 .4 .4 .2 .2 .4 .4 .3 .2 .2 .1 .1 .2 .4 .6 .7 .5 .5 .4 .4 .3 .4 .6
.9 1.1 .9 .6 .5 .4 .5 .7 .7 .8 .7 .7 .6 .6 .5 .4 .4 .4 .4 .5 .6 .5 .5 .4 .4 .7 .8 .8 .7 .7 .7 .5 .5 .3 .6 .9
.9 1.1 1.1 .9 .8 .7 .7 .9 1.0 1.2 1.0 .8 .7 .7 .7 .8 .9 .8 .9 .9 1.0 1.0 .9 .6 .4 .6 .8 .9 .9 .9 .9 .8 .8 .8 .8 .9
1.0 1.1 1.2 1.1 1.0 .9 .9 .9 1.0 1.0 1.0 1.0 .9 .9 .8 .9 1.1 1.0 1.0 1.0 1.2 1.2 .9 .7 .7 .7 1.0 1.0 1.1 1.0 .9 .9 .8 .9 .9 .9
1.0 1.1 1.1 1.1 1.0 .9 .9 .9 .9 .8 .9 1.0 1.0 1.0 1.0 1.0 1.0 .9 .9 1.0 1.0 1.0 .9 .8 .8 .7 .8 .8 1.0 1.0 .9 .8 .7 .8 .9 .8
.9 1.0 1.1 1.1 .9 .8 .7 .6 .6 .7 .7 .8 .9 1.0 1.0 1.0 .8 .6 .5 .5 .5 .5 .5 .6 .6 .6 .6 .6 .8 .9 1.0 .9 .8 .8 .8 .8
.6 .7 .8 .8 .7 .6 .5 .4 .4 .3 .4 .5 .6 .6 .7 .7 .6 .4 .3 .2 .1 .1 .1 .1 .0 .1 .1 .2 .3 .3 .5 .5 .6 .6 .6 .6
.7 .7 .7 .7 .7 .6 .6 .5 .5 .4 .4 .4 .4 .5 .4 .4 .4 .4 .3 .3 .3 .3 .2 .2 .2 .2 .2 .3 .3 .4 .4 .5 .5 .6 .6 .7

ATOVS : SD O-B TEMPERATURE DIFFERENCES (DEG C) : AMSUA-9 channel (100 hPa)
21/4/1999 to 30/4/1999
NOAA-15, USING ALL OBSERVATIONS

FIGURE 39

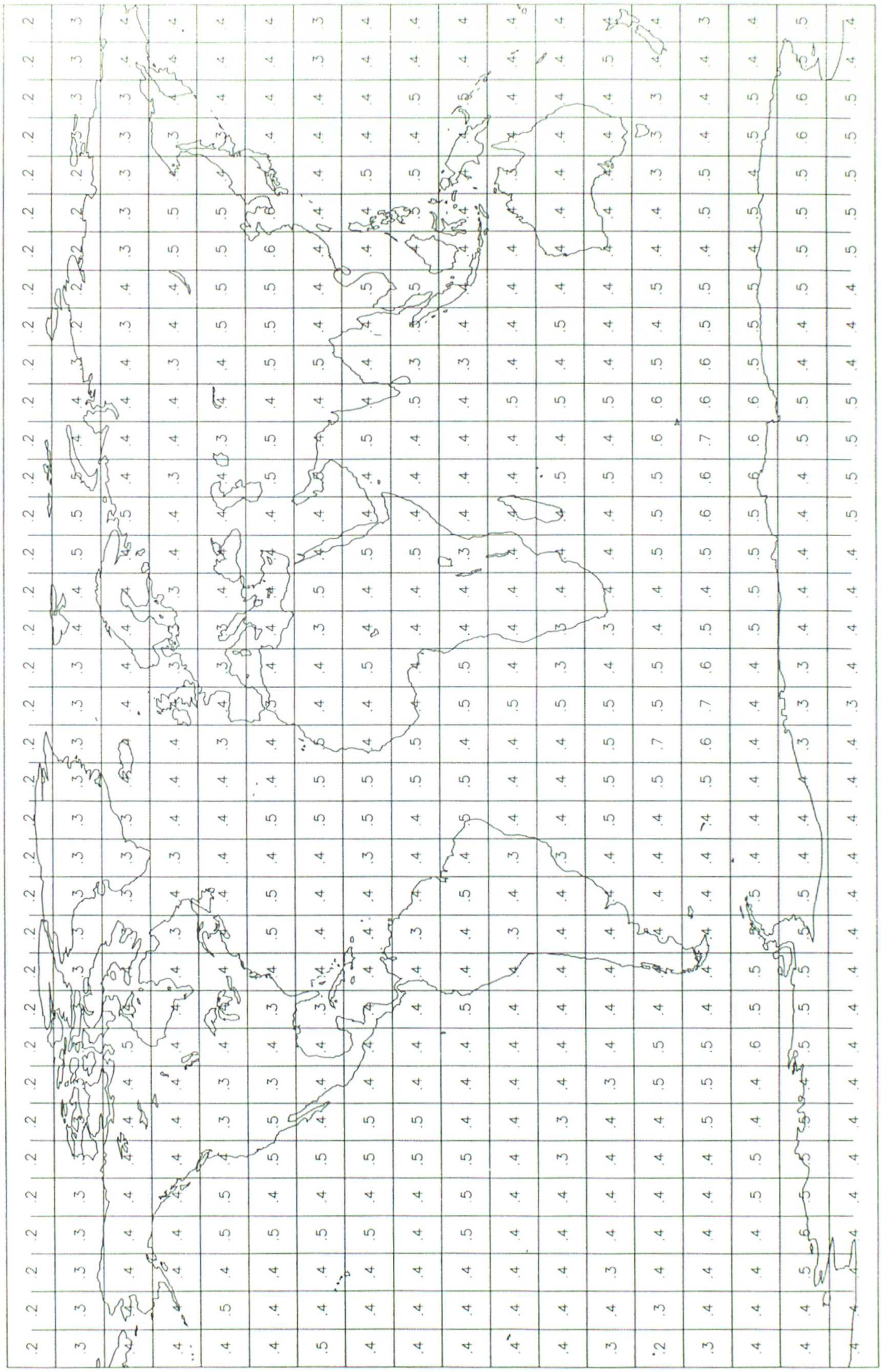


TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures
Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoy.

Area monitored :10°N - 80°N, 85°W - 0°W

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :All hours combined.

Elements monitored
:Mean sea-level pressure (hPa)
:Wind speed (m s^{-1})
:Wind direction (degrees)

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. A positive bias indicates the observation is veered to the background

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors

GROSS ERROR LIMITS :15 hPa (pressure)
:25 m s^{-1} (Vector Wind)

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
13508	16.1	-24.9	ALL	P	SUR	605	0	0	0.7	0.5	0.8
13510	24.5	-29.8	ALL	P	SUR	691	0	0	0.7	0.1	0.7
13511	18.1	-29.5	ALL	P	SUR	645	0	0	0.7	-0.7	1.0
13512	11.8	-27.6	ALL	P	SUR	615	0	0	0.7	0.5	0.8
41501	11.8	-39.4	ALL	P	SUR	602	0	0	0.9	0.3	0.9
41502	22.9	-44.2	ALL	P	SUR	159	0	0	0.9	0.2	1.0
41503	25.9	-66.3	ALL	P	SUR	86	0	0	0.7	-0.6	0.9
41504	26.2	-74.2	ALL	P	SUR	239	0	0	0.9	0.3	0.9
41505	30.8	-60.0	ALL	P	SUR	230	0	0	0.9	-0.1	0.9
41521	27.6	-54.5	ALL	P	SUR	235	0	0	0.8	0.0	0.8
41522	23.1	-34.0	ALL	P	SUR	705	0	0	0.7	-0.1	0.8
41523	16.4	-43.6	ALL	P	SUR	652	2	0	0.9	0.2	0.9
41528	30.3	-67.9	ALL	P	SUR	240	0	0	0.9	0.1	0.9
41598	26.6	-46.1	ALL	P	SUR	343	3	1	1.1	0.1	1.1
41599	29.4	-37.0	ALL	P	SUR	612	17	3	0.8	-0.3	0.9
41625	24.8	-71.3	ALL	P	SUR	220	0	0	0.8	0.1	0.8
41629	24.3	-72.2	ALL	P	SUR	226	0	0	0.8	0.1	0.8
41636	22.4	-55.2	ALL	P	SUR	532	29	5	1.2	0.2	1.2
41637	25.9	-47.1	ALL	P	SUR	375	5	1	1.0	0.3	1.0
41638	25.1	-58.8	ALL	P	SUR	623	0	0	1.2	-0.1	1.2
44513	40.0	-41.4	ALL	P	SUR	255	0	0	1.1	-1.3	1.7
44514	48.5	-39.8	ALL	P	SUR	312	0	0	1.5	-1.6	2.2
44515	41.6	-43.8	ALL	P	SUR	272	0	0	1.6	-0.9	1.8
44516	44.3	-42.2	ALL	P	SUR	147	0	0	1.8	-1.9	2.6
44517	41.0	-38.9	ALL	P	SUR	249	0	0	1.2	-1.0	1.6
44546	43.5	-40.6	ALL	P	SUR	1470	2	0	1.3	0.1	1.3
44607	53.4	-45.2	ALL	P	SUR	592	0	0	1.6	-0.4	1.6
44608	49.9	-40.6	ALL	P	SUR	1469	0	0	1.4	-0.6	1.5
44610	53.5	-39.8	ALL	P	SUR	1471	1	0	1.5	-0.5	1.6
44613	41.3	-20.3	ALL	P	SUR	1080	11	1	1.3	-0.1	1.3
44616	56.6	-27.3	ALL	P	SUR	989	0	0	1.3	-0.3	1.4
44621	46.8	-44.2	ALL	P	SUR	382	1	0	1.7	-0.8	1.9
44624	54.4	-28.8	ALL	P	SUR	928	0	0	1.3	-0.7	1.5
44728	52.4	-34.9	ALL	P	SUR	425	0	0	1.4	-0.7	1.6
44742	44.7	-7.6	ALL	P	SUR	1117	11	1	1.5	0.0	1.5
44760	53.6	-9.8	ALL	P	SUR	79	2	3	1.9	0.1	1.9
44762	38.2	-37.8	ALL	P	SUR	387	3	1	1.2	0.0	1.2
44764	50.0	-15.1	ALL	P	SUR	1006	6	1	1.7	-0.3	1.7
44765	36.8	-51.4	ALL	P	SUR	331	2	1	1.0	-0.5	1.1
44766	56.3	-48.0	ALL	P	SUR	552	1	0	1.5	-0.4	1.5
44778	48.9	-16.4	ALL	P	SUR	1308	16	1	1.7	-0.5	1.8
44901	53.2	-9.0	ALL	P	SUR	75	0	0	1.1	0.6	1.3
46510	44.7	-63.6	ALL	P	SUR	4	0	0	0.5	-5.8	5.8
62512	44.5	-18.5	ALL	P	SUR	51	0	0	1.4	0.0	1.4
62513	46.2	-7.9	ALL	P	SUR	1	0	0	0.0	1.9	1.9
62515	60.0	-9.6	ALL	P	SUR	1552	15	1	1.5	-0.1	1.5
62519	33.7	-20.0	ALL	P	SUR	868	6	1	0.8	0.1	0.8
62520	42.7	-19.8	ALL	P	SUR	985	3	0	1.2	-0.5	1.3
62554	42.6	-14.9	ALL	P	SUR	975	5	1	1.2	0.2	1.2
62603	49.9	-2.9	ALL	P	SUR	1	0	0	0.0	-1.0	1.0
62675	40.3	-35.9	ALL	P	SUR	240	0	0	1.0	-0.4	1.1
62709	57.0	0.0	ALL	P	SUR	1	0	0	0.0	1.3	1.3
64516	63.4	-30.1	ALL	P	SUR	2042	0	0	1.5	-0.5	1.6
64517	64.4	-33.5	ALL	P	SUR	1663	0	0	1.4	-0.2	1.4
64518	64.4	-33.2	ALL	P	SUR	1794	0	0	1.4	-0.6	1.6
64519	60.1	-31.0	ALL	P	SUR	1517	3	0	1.8	-0.2	1.8
64529	60.2	-12.2	ALL	P	SUR	1222	13	1	1.5	-0.8	1.8
64695	63.3	-23.3	ALL	P	SUR	424	0	0	0.9	-0.6	1.1
64845	59.2	-11.7	ALL	P	SUR	1	0	0	0.0	0.6	0.6
65591	56.5	-6.6	ALL	P	SUR	251	0	0	1.0	-0.4	1.0

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
65592	61.2	-21.8	ALL	P	SUR	426	53	12	5.0	-1.4	5.2
65593	58.5	-31.7	ALL	P	SUR	1161	21	2	1.6	-0.7	1.7
65594	59.8	-38.0	ALL	P	SUR	1140	18	2	1.5	-0.5	1.5
65595	57.3	-41.9	ALL	P	SUR	874	28	3	1.6	-0.8	1.8
65599	63.0	-35.1	ALL	P	SUR	1927	16	1	1.4	0.0	1.4
WIND SPEED											
41504	26.2	-74.2	ALL	SPEED	SUR	210	0	0	1.5	-0.8	1.7
41521	27.6	-54.5	ALL	SPEED	SUR	229	0	0	1.3	0.2	1.3
41625	24.8	-71.3	ALL	SPEED	SUR	204	0	0	1.5	-0.6	1.6
41629	24.3	-72.2	ALL	SPEED	SUR	214	0	0	1.7	-1.0	2.0
41636	22.4	-55.2	ALL	SPEED	SUR	311	0	0	1.7	-1.3	2.2
41637	25.9	-47.1	ALL	SPEED	SUR	202	0	0	1.2	-0.6	1.4
41638	25.1	-58.8	ALL	SPEED	SUR	368	0	0	1.7	-0.3	1.7
44514	48.5	-39.8	ALL	SPEED	SUR	1	0	0	0.0	4.4	4.4
44515	41.6	-43.8	ALL	SPEED	SUR	1	0	0	0.0	6.7	6.7
44607	53.4	-45.2	ALL	SPEED	SUR	572	0	0	2.6	1.7	3.2
44762	38.2	-37.8	ALL	SPEED	SUR	366	0	0	2.2	-1.3	2.6
62603	49.9	-2.9	ALL	SPEED	SUR	1	0	0	0.0	1.1	1.1
62709	57.0	0.0	ALL	SPEED	SUR	1	0	0	0.0	-0.8	0.8
65599	63.0	-35.1	ALL	SPEED	SUR	1342	0	0	2.1	-0.2	2.2
69599	62.5	-39.2	ALL	SPEED	SUR	1	0	0	0.0	3.3	3.3
WIND DIRECTION											
41504	26.2	-74.2	ALL	DIRN.	SUR	83	0	0	20.0	1.1	20.0
41521	27.6	-54.5	ALL	DIRN.	SUR	94	0	0	23.4	-8.2	24.8
41625	24.8	-71.3	ALL	DIRN.	SUR	91	0	0	16.2	9.3	18.7
41629	24.3	-72.2	ALL	DIRN.	SUR	65	0	0	13.3	10.5	17.0
41636	22.4	-55.2	ALL	DIRN.	SUR	63	0	0	18.1	15.9	24.1
41637	25.9	-47.1	ALL	DIRN.	SUR	28	0	0	14.3	-1.7	14.4
41638	25.1	-58.8	ALL	DIRN.	SUR	70	0	0	17.0	13.2	21.5
44515	41.6	-43.8	ALL	DIRN.	SUR	1	0	0	0.0	-150.1	150.1
44607	53.4	-45.2	ALL	DIRN.	SUR	456	0	0	22.0	0.3	22.0
44762	38.2	-37.8	ALL	DIRN.	SUR	278	0	0	24.9	-8.4	26.2
62603	49.9	-2.9	ALL	DIRN.	SUR	1	0	0	0.0	19.5	19.5
62709	57.0	0.0	ALL	DIRN.	SUR	1	0	0	0.0	-39.9	39.9
65599	63.0	-35.1	ALL	DIRN.	SUR	972	0	0	22.9	-0.2	22.9
69599	62.5	-39.2	ALL	DIRN.	SUR	1	0	0	0.0	-65.3	65.3

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:40°N - 70°N, 60°W - 0°W.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:300.0 - 150.0 hPa
Elements monitored		:TEMP in °C ; WIND in m s^{-1}
Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.
GROSS ERROR LIMITS	:10.0 °C ; 60 m s^{-1} Vector Wind	
SELECTION CRITERIA	:N REP $\geq$ 20	

NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	3155	1	25	2.0	-0.2	2634	0	15	0	8.3	1.2
ACA	1263	1	10	2.0	-0.2	1190	0	5	0	6.1	0.4
AEA	209	1	21	2.1	-0.4	190	1	16	0	8.7	2.1
AEL	570	1	23	2.7	0.5	571	0	21	0	8.4	1.5
AEY	39	0	3	1.8	0.9	40	0	5	0	9.2	0.3
AFL	280	1	13	2.0	0.4	257	1	9	0	9.1	1.1
AFR	1332	0	14	1.9	0.0	1328	0	14	0	8.3	1.2
AIH	120	1	15	1.5	-0.1	116	0	10	0	8.2	0.8
AJM	50	0	6	2.1	-1.1	53	0	6	0	9.0	2.4
AMM	72	0	6	2.4	0.8	72	0	4	0	8.2	1.2
AMX	264	3	6	1.9	-0.4	266	0	6	0	10.5	1.4
ANZ	258	0	15	2.1	-1.1	253	0	14	0	6.0	0.3
AOM	341	1	7	1.9	0.6	344	0	7	0	9.3	1.2
AVA	152	1	5	2.1	-0.5	163	0	6	0	10.3	1.1
AZA	459	1	26	2.6	0.4	406	0	20	0	9.9	0.9
BAF	44	0	11	2.2	-1.2	43	0	9	0	4.9	0.2
BAL	317	0	18	1.9	-0.3	314	0	18	0	7.8	1.3
BAW	1742	1	22	2.3	-0.4	1632	0	18	0	7.1	1.0
BLX	27	0	11	1.9	-0.1	27	0	11	0	8.2	2.1
BWA	95	2	9	2.5	1.6	95	1	11	0	9.1	0.6
CDN	652	0	12	1.8	0.3	606	0	9	0	8.3	0.8
CFC	40	3	15	1.9	0.3	40	0	18	0	8.5	0.0
CFG	572	0	6	2.0	-0.9	567	0	4	0	7.9	1.3
CKS	75	0	11	2.8	0.9	77	1	10	0	8.4	2.1
CKT	127	1	17	1.9	0.9	114	0	14	0	11.8	1.1
CLX	378	0	14	2.0	-0.5	353	1	10	0	7.1	0.3
CMM	133	0	6	1.5	0.0	126	0	3	0	5.4	0.8
COA	974	1	25	2.1	-0.1	832	0	20	0	13.0	4.1
CRL	319	1	6	1.6	0.2	318	0	5	0	8.2	1.9
CTB	175	1	3	1.8	-0.4	179	0	1	0	5.6	1.1
CUB	289	1	13	1.9	0.3	279	0	13	0	11.3	0.3
DAL	1755	1	33	1.9	-0.6	1480	0	25	0	9.1	0.9
DBY	387	0	4	1.8	-0.7	395	0	4	0	8.4	1.2
DLH	2395	1	17	2.0	-0.4	2216	0	13	0	7.4	1.0
EEZ	52	2	33	2.4	-1.5	50	2	34	0	11.6	1.5
EIA	43	0	23	2.2	0.8	40	3	23	0	10.2	3.3
ELY	149	2	13	1.7	-0.4	147	1	7	0	8.1	0.3
EWW	96	1	20	1.7	0.2	84	0	15	0	7.3	1.9
FDX	535	1	25	2.0	0.3	451	0	16	0	8.4	1.6
FIN	387	2	22	1.9	0.4	319	0	11	0	8.3	0.9
GAF	53	2	32	2.3	-1.3	44	0	16	0	7.6	2.0
GTI	67	0	31	2.2	0.3	61	0	28	0	9.0	1.9
HLF	34	0	9	2.4	-0.8	32	3	6	0	8.6	1.7
IBE	1644	1	27	2.0	0.3	1581	0	26	0	9.6	1.4
ICE	1156	1	19	1.9	0.0	985	0	12	0	6.4	0.6
JKK	144	1	28	2.1	0.0	124	0	19	0	9.9	1.2
KLM	2211	0	13	1.9	0.0	2092	0	11	0	7.9	1.0
LDA	75	1	24	1.6	0.2	66	0	18	0	10.9	-0.4
LDI	398	0	29	2.3	-1.2	368	0	23	0	7.9	1.0
LGL	50	0	8	2.8	-1.9	49	0	8	0	7.8	-0.9
LIB	184	1	3	2.1	1.2	186	0	4	0	8.2	1.0
LOT	219	0	15	2.1	-1.0	195	1	11	0	7.8	0.2
LTU	466	0	25	1.9	-0.5	403	0	14	0	8.1	1.5
MAS	57	0	12	2.5	0.7	57	0	12	0	11.5	-0.5
MON	27	0	19	2.0	0.5	24	0	17	0	8.5	-1.9
MPD	96	3	9	2.1	1.0	95	0	11	0	13.0	1.5
MPH	426	1	11	2.0	-0.8	400	0	7	0	7.8	1.3
NCA	31	0	6	1.6	-0.3	31	0	6	0	6.6	0.6
NWA	3207	1	11	2.1	0.7	2919	0	6	0	8.1	1.0

		TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
OAL	38	0	18	3.2	1.8	35	0	14	0	7.5	0.7
PAC	111	1	24	2.1	-0.4	95	0	19	0	8.2	0.5
RAM	60	2	8	2.5	-0.5	59	0	8	0	9.5	1.9
RCH	337	1	21	2.2	0.7	324	0	100	0	11.0	1.8
RJA	21	0	24	1.8	-1.2	21	5	19	0	10.8	1.3
ROY	40	5	25	2.5	-0.1	37	0	22	0	8.4	0.7
RRR	67	1	7	1.8	0.0	62	0	6	0	4.9	0.8
SAB	50	2	14	2.0	0.1	50	0	10	0	6.6	-0.3
SAS	1462	0	1	1.6	-0.5	1450	0	2	0	7.3	0.5
SEU	40	8	18	2.3	1.0	37	0	8	0	13.1	0.5
SIA	153	0	7	2.2	-1.1	148	0	8	0	7.1	0.6
SLR	114	0	27	1.6	-0.3	116	1	29	0	10.2	0.7
SVA	112	0	12	1.8	-0.1	115	1	10	0	8.3	0.4
SWR	139	1	20	1.6	0.0	118	0	9	0	7.2	0.1
TAP	465	0	13	1.9	-0.4	464	0	14	0	9.0	1.6
TOW	149	1	30	1.9	0.1	118	0	18	0	7.7	1.3
TSC	39	0	36	2.5	0.5	31	0	23	0	13.2	1.4
TWA	1223	0	28	2.1	0.1	981	0	17	0	9.7	1.3
UAL	2161	0	14	2.0	-0.3	2008	0	9	0	7.0	1.1
UPS	746	1	34	2.0	0.2	673	0	31	0	7.7	1.0
USA	231	0	26	2.1	-0.1	181	1	19	0	8.7	2.3
VIR	386	1	12	2.0	-0.6	362	0	9	0	8.8	1.1
VKG	68	0	12	1.8	0.5	62	0	6	0	9.8	1.5
BA	8998	0	1	1.4	0.2	8996	0	1	0	5.9	0.8
KL	3615	0	1	1.9	1.2	3617	0	0	0	6.0	0.8
LH	28	0	0	1.1	0.5	28	0	0	0	3.0	0.9
N	310	1	13	2.5	0.2	293	0	10	0	8.5	0.9
ADS	122	0	0	1.1	-0.2	122	0	0	0	5.0	0.6
US ACARS	13310	0	3	1.6	0.3	13308	0	2	0	6.6	0.9

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	100	1	0	0.0	4.0	-4.0
DBBH	12	Z	100	16	0	12.6	12.7	1.4
DBLK	00	Z	100	1	0	0.0	30.0	30.0
ELML7	00	Z	100	13	0	9.4	17.9	15.2
ELML7	12	Z	100	20	0	16.6	31.9	27.2
FNOR	00	Z	100	12	0	12.7	21.9	17.8
FNOR	12	Z	100	12	0	11.4	12.7	5.6
FNPH	00	Z	100	16	0	14.6	18.0	10.6
FNPH	12	Z	100	17	0	15.5	16.4	5.4
FNRS	00	Z	100	17	0	65.2	66.6	-13.8
FNRS	12	Z	100	15	0	16.7	17.4	-5.1
JBOA	00	Z	100	1	0	0.0	23.0	23.0
JCCX	00	Z	100	1	0	0.0	33.0	33.0
JDWX	00	Z	100	1	0	0.0	35.0	35.0
JGQH	00	Z	100	1	0	0.0	27.0	27.0
LDWR	00	Z	100	26	0	9.8	10.2	2.7
LDWR	12	Z	100	27	0	12.1	12.3	-2.3
OVYA2	00	Z	100	7	0	25.5	27.6	-10.6
OVYA2	12	Z	100	5	0	15.1	15.1	-1.0
OXTS2	00	Z	100	4	0	9.7	11.6	6.5
OXTS2	12	Z	100	3	0	8.6	8.6	0.7
SHIPCB	00	Z	100	1	0	0.0	57.0	57.0
SHIPS	00	Z	100	2	0	15.0	28.3	24.0
UCKZ	00	Z	100	8	0	11.6	50.6	49.3
V2XM	00	Z	100	14	0	13.0	17.4	11.6
V2XM	12	Z	100	11	0	17.0	17.0	-0.5
XXBA	00	Z	100	1	0	0.0	31.0	31.0
XXBA	12	Z	100	1	0	0.0	38.0	38.0
03953	00	Z	100	29	0	13.0	20.5	15.8
03953	12	Z	100	29	0	21.2	25.7	14.4
04018	00	Z	100	30	0	10.5	16.0	12.0
04018	12	Z	100	29	0	11.9	12.0	-0.9
04220	00	Z	100	5	0	3.4	13.6	13.2
04220	12	Z	100	7	0	12.9	17.6	12.0
04270	00	Z	100	29	0	13.4	14.1	4.2
04270	12	Z	100	30	0	13.8	13.8	-1.0
04339	00	Z	100	24	0	8.6	14.3	11.4
04339	12	Z	100	23	0	14.1	15.4	6.2
04360	00	Z	100	28	0	8.9	13.4	10.0
04360	12	Z	100	28	0	11.1	12.4	5.4
08001	00	Z	100	23	0	13.3	20.0	15.0
08001	12	Z	100	21	0	15.4	15.5	-1.2
08508	00	Z	100	1	0	0.0	15.0	15.0
08508	12	Z	100	25	0	12.4	14.8	-8.0
08522	00	Z	100	1	0	0.0	1.0	1.0
08522	12	Z	100	29	0	17.2	17.8	4.4
08594	00	Z	100	1	0	0.0	6.0	-6.0
08594	12	Z	100	18	0	21.8	25.6	13.4
60020	00	Z	100	2	0	49.0	71.4	52.0
71600	00	Z	100	29	0	16.3	16.6	3.1
71600	12	Z	100	30	0	20.3	22.9	-10.5
72201	00	Z	100	21	0	9.4	39.0	37.8
72201	12	Z	100	24	0	16.0	43.4	40.4
72402	00	Z	100	25	0	20.2	27.9	19.3
72402	12	Z	100	26	0	13.3	37.2	34.7
74494	00	Z	100	26	0	13.5	15.6	7.7
74494	12	Z	100	26	0	15.8	15.9	-2.1
78016	12	Z	100	26	0	12.5	30.7	28.1

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	500	1	0	0.0	4.0	4.0
DBBH	12	Z	500	21	0	10.3	13.2	8.2
DBLK	00	Z	500	1	0	0.0	2.0	-2.0
ELML7	00	Z	500	18	0	6.4	12.6	10.8
ELML7	12	Z	500	20	0	7.3	11.2	8.4
FNOR	00	Z	500	13	0	10.1	16.0	12.5
FNOR	12	Z	500	16	0	9.1	14.1	10.8
FNPH	00	Z	500	17	0	7.1	7.7	2.9
FNPH	12	Z	500	17	0	9.3	11.9	7.4
FNRS	00	Z	500	17	1	7.1	8.6	4.9
FNRS	12	Z	500	15	0	12.1	12.3	2.1
JBOA	00	Z	500	1	0	0.0	8.0	-8.0
JCCX	00	Z	500	1	0	0.0	12.0	12.0
JDWX	00	Z	500	1	0	0.0	9.0	9.0
JGQH	00	Z	500	1	0	0.0	5.0	-5.0
LDWR	00	Z	500	27	0	9.1	9.7	3.1
LDWR	12	Z	500	27	0	8.9	9.2	-2.3
OVYA2	00	Z	500	7	0	13.3	17.1	-10.7
OVYA2	12	Z	500	6	0	7.7	12.1	-9.3
OXTS2	00	Z	500	4	0	5.2	5.5	-1.8
OXTS2	12	Z	500	3	0	12.7	13.6	-5.0
SHIPCB	00	Z	500	1	0	0.0	38.0	38.0
SHIPDD	00	Z	500	1	0	0.0	30.0	30.0
SHIPS	00	Z	500	2	0	0.5	6.5	6.5
UCKZ	00	Z	500	8	0	10.7	15.0	10.5
V2XM	00	Z	500	14	0	18.5	18.8	3.4
V2XM	12	Z	500	12	0	12.7	12.8	1.7
XXBA	00	Z	500	1	0	0.0	16.0	16.0
XXBA	12	Z	500	2	0	6.0	9.2	7.0
03953	00	Z	500	29	0	9.7	11.9	6.9
03953	12	Z	500	30	0	18.2	18.9	4.9
04018	00	Z	500	30	0	10.6	15.5	11.3
04018	12	Z	500	29	0	10.9	11.5	3.8
04220	00	Z	500	28	0	8.8	13.9	10.8
04220	12	Z	500	30	0	11.3	14.3	8.9
04270	00	Z	500	29	0	12.8	12.9	1.7
04270	12	Z	500	30	0	12.2	12.2	-0.7
04339	00	Z	500	29	0	10.3	15.2	11.2
04339	12	Z	500	30	0	10.6	11.9	5.5
04360	00	Z	500	28	0	8.7	9.6	3.9
04360	12	Z	500	29	0	11.1	11.5	3.0
08001	00	Z	500	28	0	21.7	22.1	4.0
08001	12	Z	500	27	0	11.9	11.9	-0.7
08508	00	Z	500	1	0	0.0	2.0	2.0
08508	12	Z	500	29	0	8.5	11.0	7.0
08522	00	Z	500	1	0	0.0	4.0	-4.0
08522	12	Z	500	29	0	8.2	10.9	7.2
08594	00	Z	500	1	0	0.0	2.0	2.0
08594	12	Z	500	21	0	9.4	9.7	2.1
60020	00	Z	500	27	0	13.5	15.8	8.3
60020	12	Z	500	29	0	9.3	9.8	3.0
71600	00	Z	500	29	0	18.7	20.8	-9.0
71600	12	Z	500	30	0	15.3	16.5	-6.3
72201	00	Z	500	23	0	6.4	18.2	17.0
72201	12	Z	500	24	0	6.1	10.9	9.0
72402	00	Z	500	28	0	15.2	15.4	-2.3
72402	12	Z	500	29	0	10.2	11.3	4.7
74494	00	Z	500	29	0	12.8	12.8	0.4
74494	12	Z	500	30	0	9.9	9.9	-0.3
78016	12	Z	500	26	0	8.6	21.6	19.8

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :100 hPa.

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	100	1	0	0	0.0	9.1	5.2
DBBH	12	V	100	15	0	6	0.0	-1.5	-2.3
ELML7	00	V	100	8	0	0	3.5	1.1	0.9
ELML7	12	V	100	17	0	0	3.5	0.4	0.2
FNOR	00	V	100	10	0	0	3.2	-1.0	0.1
FNOR	12	V	100	8	0	0	2.4	-1.2	-0.5
FNPH	00	V	100	16	0	0	2.4	0.2	0.4
FNPH	12	V	100	14	0	0	4.5	0.2	1.2
FNRS	00	V	100	14	0	0	2.7	0.7	0.0
FNRS	12	V	100	14	0	0	3.3	1.3	0.2
JBOA	00	V	100	1	0	0	2.4	-2.0	2.3
JCCX	00	V	100	1	0	0	2.4	-2.1	-3.4
JDWX	00	V	100	1	0	0	2.4	4.6	0.3
JGQH	00	V	100	1	0	0	2.4	2.0	3.3
LDWR	00	V	100	27	0	0	2.4	-0.3	-0.5
LDWR	12	V	100	27	0	0	1.8	-0.8	-0.5
OVYA2	00	V	100	7	0	0	2.0	1.9	-0.2
OVYA2	12	V	100	5	0	0	2.0	-0.4	0.4
OXTS2	00	V	100	3	0	0	2.0	-0.1	-2.3
OXTS2	12	V	100	3	0	0	2.0	1.8	0.6
SHIPCB	00	V	100	1	0	0	2.0	4.0	2.2
SHIPS	00	V	100	1	0	100	2.0	-49.4	-13.0
V2XM	00	V	100	12	0	0	2.0	0.2	-0.5
V2XM	12	V	100	10	0	0	2.8	0.7	0.3
03953	00	V	100	29	0	3	2.8	-0.1	0.5
03953	12	V	100	28	0	0	2.2	0.2	0.8
04018	00	V	100	27	0	0	2.1	-0.8	0.5
04018	12	V	100	28	0	0	2.3	0.3	0.4
04220	00	V	100	5	0	0	2.4	1.2	-2.3
04220	12	V	100	6	0	0	2.4	1.4	-0.4
04270	00	V	100	29	0	0	2.4	0.5	-0.1
04270	12	V	100	26	0	0	2.1	0.1	-0.8
04339	00	V	100	22	0	4	2.9	0.8	-0.2
04339	12	V	100	21	0	0	4.7	0.5	-0.3
04360	00	V	100	26	0	0	3.0	0.3	0.1
04360	12	V	100	27	0	0	2.1	-0.5	-0.1
08001	00	V	100	22	0	0	7.5	1.4	1.3
08001	12	V	100	21	0	0	3.6	-1.4	0.0
08508	00	V	100	1	0	0	2.8	4.8	2.1
08508	12	V	100	16	0	0	2.8	0.0	0.2
08594	00	V	100	1	0	0	2.7	-5.0	8.7
08594	12	V	100	18	0	5	2.7	-1.2	3.1
60020	00	V	100	1	0	0	3.3	3.3	-3.8
71600	00	V	100	29	0	0	3.0	1.5	-0.3
71600	12	V	100	30	0	0	3.6	0.4	0.9
72201	00	V	100	20	0	0	4.3	0.7	0.8
72201	12	V	100	24	0	0	3.0	0.4	-1.2
72402	00	V	100	25	0	0	3.6	0.4	2.4
72402	12	V	100	26	0	0	3.9	0.2	0.5
74494	00	V	100	24	0	0	4.2	0.8	0.4
74494	12	V	100	26	0	0	2.5	0.0	0.8
78016	12	V	100	26	0	0	1.8	1.9	1.7

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: April 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :500 hPa.

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:UBIAS,VBIAS: Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	500	1	0	0	0.0	-0.2	0.9
DBBH	12	V	500	21	0	4	0.0	-0.1	0.9
ELML7	00	V	500	17	0	0	4.4	-0.2	1.2
ELML7	12	V	500	19	0	0	2.7	0.2	0.0
FNOR	00	V	500	12	0	0	2.9	0.1	1.9
FNOR	12	V	500	12	0	0	2.7	0.0	-0.7
FNPH	00	V	500	14	0	0	3.6	-0.5	0.8
FNPH	12	V	500	16	0	0	2.3	1.3	0.7
FNRS	00	V	500	14	0	0	2.9	-0.5	0.0
FNRS	12	V	500	14	0	0	1.9	-1.1	-0.5
JBOA	00	V	500	1	0	0	2.9	0.8	3.8
JCCX	00	V	500	1	0	0	2.9	2.7	1.5
JDWX	00	V	500	1	0	0	2.9	-4.2	-4.2
JGQH	00	V	500	1	0	0	2.9	-1.4	0.1
LDWR	00	V	500	28	0	3	2.9	0.2	0.4
LDWR	12	V	500	27	0	0	3.1	0.1	0.1
OVYA2	00	V	500	5	0	0	2.0	0.5	-0.7
OVYA2	12	V	500	4	0	0	2.0	0.2	0.4
OXTS2	00	V	500	3	0	0	2.0	-2.2	3.9
OXTS2	12	V	500	3	0	0	2.0	1.6	0.9
SHIPCB	00	V	500	1	0	0	2.0	4.5	-0.2
SHIPDD	00	V	500	1	0	0	2.0	2.2	1.3
SHIPS	00	V	500	2	0	0	2.0	1.2	2.7
V2XM	00	V	500	12	0	8	2.0	-0.8	-1.1
V2XM	12	V	500	11	0	0	5.5	-0.3	1.3
03953	00	V	500	29	0	3	3.3	-0.2	0.4
03953	12	V	500	28	0	0	4.2	1.3	0.7
04018	00	V	500	30	0	0	4.0	0.2	0.4
04018	12	V	500	28	0	0	2.7	0.2	-1.0
04220	00	V	500	27	0	3	4.7	0.7	0.6
04220	12	V	500	24	0	0	5.4	-0.7	-0.3
04270	00	V	500	28	0	0	3.2	-0.7	-0.1
04270	12	V	500	24	0	0	2.9	-1.5	0.0
04339	00	V	500	28	0	0	5.6	0.2	-0.8
04339	12	V	500	29	0	0	3.5	-0.7	-0.7
04360	00	V	500	25	0	0	3.6	-1.0	1.6
04360	12	V	500	27	0	0	3.4	-1.3	0.7
08001	00	V	500	28	0	0	3.3	0.6	2.0
08001	12	V	500	27	0	0	4.3	2.2	-0.8
08508	00	V	500	1	0	0	2.3	3.5	-0.4
08508	12	V	500	28	0	3	2.3	-0.6	2.2
08594	00	V	500	1	0	0	2.5	3.1	-10.2
08594	12	V	500	20	0	0	2.5	-0.5	0.1
60020	00	V	500	26	0	0	3.3	-0.3	-0.6
60020	12	V	500	29	0	0	2.5	0.4	-0.4
71600	00	V	500	29	0	0	2.8	0.6	-1.0
71600	12	V	500	30	0	3	3.6	1.3	0.6
72201	00	V	500	23	0	0	3.0	-0.6	0.0
72201	12	V	500	24	0	0	2.4	-0.1	-0.4
72402	00	V	500	28	0	0	2.3	-0.2	0.8
72402	12	V	500	29	0	0	3.6	1.5	0.3
74494	00	V	500	29	0	0	2.6	-0.6	0.5
74494	12	V	500	29	0	0	3.4	1.1	0.5
78016	12	V	500	26	0	0	2.2	1.2	0.4

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45